CONCEPTUAL DESIGN REPORT
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

April 1997

Prepared for

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Chicago, Illinois
and
Burlington Northern and Santa Fe Railway
Minneapolis, Minnesota

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EXECUTIVE SUMMARY

This report has been prepared to present the results and evaluations of recent data collection activities and the Conceptual Design for the Removal Action (Conceptual Design) to prevent the discharge of free-phase oil into the Sylvan Slough of the Mississippi River at Rock Island, Illinois. The data collection and evaluation activities described herein have been performed specifically to support the Conceptual Design effort for the Sylvan Slough Removal Action Site. The work is being conducted pursuant to Administrative Order on Consent, Docket No. V-W-94-C242 between the United States Environmental Protection Agency (USEPA) and Navistar International Transportation Corp. (Navistar) and Burlington Northern Railroad Company, now known as the Burlington Northern and Santa Fe Railway Company (BNSF). Iowa Interstate Railroad declined to participate according to a letter to the USEPA dated April 19, 1993.

The site is underlain by fill (Upper Fill Unit) in the area immediately adjacent to the river. The fill is composed of fine- to medium-grained foundry sands, with lesser amounts of crushed glass, slag, and timber. The Upper Fill Unit is up to 26 feet thick adjacent to the slough, and thins to the south away from the slough. The Upper Fill Unit is locally underlain by a stiff to dense, olive green, silty clay unit (Confining Clay Unit) ranging from one to greater than five feet thick adjacent to the slough which thins and eventually pinches out (absent) to the south before reaching the Iowa Interstate property. The upper and lower surfaces of the clay are irregular. Beneath the Confining Clay is the Lower Sand and Gravel Unit which consists of sand and gravel with shell fragments and pebbles of limestone, sandstone, shale and various igneous rocks. The Lower Sand and Gravel Unit is thickest adjacent to the slough and becomes thinner to the south and appears to eventually pinch out to the south.

Approximately three feet of the Upper Fill Unit is water saturated, and the saturated thickness of the unconsolidated materials in the unconfined zone increases to 7 to 10 ft to the south where the Confining Clay is absent. The hydraulic gradient in these materials is generally north towards the slough. The Lower Sand and Gravel Unit beneath the Confining Clay Unit is fully saturated, but there may be localized areas where, at times, portions of the Lower Sand and Gravel may not be fully saturated. The hydraulic gradient is generally towards the slough, but short term gradient reversals are possible at times of high river stage.

Free-phase oil can be found in discrete areas in both the Upper Fill Unit and the Lower Sand and Gravel. The distribution of free-phase oil was estimated during the Pre-Design Study conducted in December 1995 through measurements in monitoring wells and with a cone penetrometer/rapid optical screening tool (CPT/ROST) study. The measurement of the thickness of oil in wells generally overestimates the thickness of oil in the materials surrounding the well. The CPT/ROST study utilized the fluorescence of the oil to estimate the potential presence of oil. A pulsed laser light is directed through a sapphire window in the penetrometer tool into the surrounding materials. The materials absorb the light and hydrocarbons emit energy as fluorescence. The ROST fluorescence intensity is converted to Total Recoverable Hydrocarbons (TPH) using a regression analysis between TPH soil sample results and ex-situ ROST fluorescence intensity measurements on the soil samples.

Areas of potentially recoverable oil were further evaluated during the well installation associated with Phase I of the oil recovery system implementation. The additional monitoring wells were installed in September and October 1996 and several subsequent fluid level monitoring events have been performed. In the Upper Fill Unit, free-phase oil is present in discrete areas at the water table. Free-phase oil is present in Areas A, C, and E in the Upper Fill Unit. Free-phase oil is present in the Lower Sand and Gravel Unit in Areas G, H, I, and J. In the Lower Sand and Gravel, free-phase oil is likely to be present in discrete pockets beneath shallow areas in the base of the Confining Clay.

Intermittent oil seeps, which form an iridescent film on the water surface, have been reported in the vicinity of Areas G and H.

The presence of the oil beneath the clay layer indicates that the major source of oil must be beyond the southern extent of the clay. The former Rock Island Railroad property, currently owned by Iowa Interstate Railroad, is located beyond the southern extent of the Confining Clay layer, hydraulically upgradient and to the south of the Navistar and BNSF properties. A leak in the ground connections of the Rock Island Railroad's 150,000-gallon diesel fuel above-ground tank which occurred in late 1963 or 1964 was linked to oil seeps observed in Sylvan Slough in 1964. The Rock Island Railroad's product loss was estimated to be on the order of tens of thousands of gallons. It is believed that the 1963-1964 Rock Island oil spill is the source of the majority of the oil currently found at the site. No leaks were found in Burlington Railroad's fuel oil piping. The Rock Island Railroad conducted subsurface oil recovery operations along the northern boundary of the Rock Island Railroad property beginning in 1964. However, there is no documentation regarding the effectiveness of the recovery operation, the quantities of diesel fuel recovered or any confirmatory soil or groundwater sampling.

The goal of the removal action is to prevent the discharge of free-phase oil into the slough. A removal action evaluation was prepared "Alternatives Evaluation Technical Memorandum," November 15, 1995 and a passive oil recovery well system was recommended by Geraghty & Miller, and approved by the USEPA in a letter dated December 1, 1995. This approach was selected because of the thin saturated thickness in the Upper Fill Unit which would make gradient control difficult and because pumping water would be less efficient in oil removal over the long term due to bypass trapping. Bypass trapping occurs where moving water disconnects the flow of oil, reducing the mobility of the oil. Passive oil removal was selected for the Lower Sand and Gravel Unit because the unit is a confined aquifer, highly transmissive, and the structure of the confining clay presented an opportunity to utilize natural gradients to collect the oil in wells.

In any free-phase oil recovery situation, a portion of the oil will be retained in the formation materials as non-recoverable oil, because the oil becomes immobile at low saturations. This residual oil is trapped as small, immobilized, disconnected pockets of liquid within the unit. Residual non-recoverable oil and the associated dissolved constituents will be mitigated through natural attenuation processes. Natural attenuation processes include biodegradation, dispersion, sorption, and volatilization, but the most important mechanism for the attenuation of petroleum hydrocarbons in the subsurface is biodegradation. The USEPA stated in its Advanced Notice of Proposed Rulemaking on RCRA Corrective Action that the three major programs, Superfund, RCRA and Underground Storage Tanks, recognize that natural attenuation can be an acceptable component of remedial actions for groundwater.

The passive oil recovery pilot test system operated for approximately one month beginning on September 19, 1996, utilizing pilot test recovery wells RW-4, RW-5, RW-6, and RW-7. Approximately 40 gallons of oil was recovered. Pneumatically powered, bladder type pumps equipped with oleophillic screens were used to recover the oil. The oleophillic screen only allows oil to pass though it. The above grade components to the system include an above-ground piping system for oil collection and air pressure, an above ground oil storage tank, an air compressor and an equipment building. The system operated as designed and no leaks were observed in the system piping. The system continued to operate after the close of the pilot test period.

The passive oil collection system will be implemented in three phases. Phase I is the installation of additional wells, well testing, well abandonment, completion of the pilot test and the connection of additional wells to the existing passive oil recovery system. Phase II includes the oil recovery operation and monitoring of the Phase I wells and the pilot test wells. The need for additional wells in Phase III will be evaluated as the remediation progresses. The complete system will then be operated until the available oil is recovered. A containment boom may be installed in Phase I, II or III in areas where active seeps are reported. The length of boom will be minimized by locating it only in areas where active seeps are observed.

1.0 INTRODUCTION

This report has been prepared to present the results and evaluations of recent data collection activities and the Conceptual Design of the Removal Action (Conceptual Design) which is designed to prevent the discharge of free-phase oil into the Sylvan Slough of the Mississippi River, Rock Island, Illinois from the Sylvan Slough Removal Action Site. The Conceptual Design describes the phased implementation of the full-scale oil recovery system. The data collection and evaluation activities described herein have been performed specifically to support the Conceptual Design effort. The work is being conducted pursuant to Administrative Order on Consent, Docket No. V-W-94-C242 between the United States Environmental Protection Agency (USEPA) and Navistar International Transportation Corp. (Navistar) and Burlington Northern Railroad Company, now known as Burlington Northern and Santa Fe Railway Company (BNSF). Iowa Interstate Railroad declined to participate according to a letter to the USEPA dated April 19, 1993. Iowa Interstate Railroad owns the property to the south of BNSF and Navistar. Sylvan Slough is located to the north of the BNSF and Navistar properties.

The information presented in this report supplements earlier removal action evaluations (see Alternatives Evaluation Technical Memorandum November 15, 1995, Aquifer Pump Test Report, September 1995, Phase II Site Investigation Report, April 15, 1995, Initial Site Investigation Report, March 1994). The Aquifer Pump Test Report is summarized below.

The most significant finding of the September 1995 Aquifer Pump Test Report was the identification of a locally continuous, thin clay layer between the Upper Fill Unit and the Lower Sand and Gravel Unit. The thin clay layer functions as a low-permeability confining layer trapping oil beneath it. Indications are that the majority of the free-phase oil at the site is present in the confined Lower Sand and Gravel Unit. As discussed in Sections 2 and 4 of this report, the presence of the oil beneath the clay layer indicates that the major source of oil must be beyond the southern extent of the clay, which is the upgradient side of the confining layer. The 1963-1964 Rock Island oil spill is believed to be the major source of oil at the site, as this release occurred to the upgradient side of the confining layer.

Recent data collection and evaluation activities performed to further integrate subsurface site characteristics into the Conceptual Design have included the Pre-Design Study, Passive Oil Recovery Pilot Test, and the well installation associated with Phase I of the oil recovery system implementation (Phase I Implementation). The Pre-Design Study was conducted to better define the location of the thin clay layer and the potential occurrence of recoverable amounts of oil. The Passive Oil Recovery Pilot Test was conducted to demonstrate that the passive oil recovery techniques planned would be effective. Additional well installations were completed to further evaluate the extent of areas with potentially recoverable oil as part of the Phase I Implementation.

Organizationally, the remainder of this report includes *Site Background Information* (Section 2) describing the site setting and recent site history, and *Field Work* (Section 3) which discusses the scope of work and methodology for the recent field data collection activities. A summary of the site characteristics that influence the migration behavior of the free-phase oil at the site is presented in the Section 4, *Site Characteristics.* The conceptual design for the phased implementation of the full-scale oil recovery system is presented in Section 5 (*Conceptual Approach to Full Scale Implementation*) and *References* cited are provided in Section 6.

2.0 SITE BACKGROUND

2.1 SITE SETTING

The Sylvan Slough Removal Action Site is located along the Sylvan Slough between the Iowa Interstate Railroad bridge and the former International Harvester Farmall (Farmall) manufacturing facility, currently known as the Quad City Industrial Center (QCIC) in the City of Rock Island, Rock Island County, Illinois (Figure 1). The Sylvan Slough is a portion of the Mississippi River that flows between the Sylvan Slough Removal Action Site and the Rock Island Arsenal. The Iowa Interstate Railroad is located to the south of the Navistar/BNSF properties. The southern bank of the slough forms the northern boundary of the Navistar/BNSF properties. The bank of the slough is steep sided and approximately 20 feet high.

2.2 SITE HISTORY

An oil seep at the Sylvan Slough site was observed in 1964 by Mr. Hank Hannah, Rock Island County Conservation Officer, and Mr. Keith Weeber, Regional Sanitary Engineer of the Illinois Public Health Department (IPHD). They observed that most of the oil was seeping out of an approximate 1,000-foot long section of the river bank to Sylvan Slough downstream of the former Farmall facility (Weeber 1964a). According to the inspection report, the location of the oil seepage implicates the source as the Rock Island Railroad diesel fuel leak (Weeber 1964a). According to the inspection report, the Rock Island railroad fuel oil leak was discovered and stopped over one month prior to the August 4, 1964 inspection report, and they concluded that "a tremendous amount of oil is in the ground and will continue to seep out into the river for a long time" (Weeber 1964a).

A leak in the ground connections of the Rock Island Railroad 150,000-gallon diesel fuel aboveground tank had apparently developed sometime in late 1963 or early 1964 (Moline Dispatch 1965). The leak is believed to have increased in magnitude during the winter of 1964, resulting in a significant loss of product to the subsurface (Moline Dispatch 1965). The amount of product loss was estimated to be on the order of tens of thousands of gallons (Giallombardo 1964). Burlington Northern verified the integrity of their fuel oil lines, and found none to be leaking (Giallombardo, November 1964).

A number of excavation sumps and trenches were installed in late 1964 and early 1965 by the Rock Island Railroad along the northern boundary of the former Rock Island Railroad property to prevent the flow of diesel fuel to the Sylvan Slough (Moline Dispatch 1965). Diesel fuel was reportedly observed flowing into some of these trenches from a 30-inch thick soil stratum. Oil was also reportedly observed seeping into Sylvan Slough from a 1,000-foot section of the bank in a zone that extended from below the water surface to a point approximately 18 inches above the water surface (Giallombardo, October 1964). Although a recovery system was installed subsequent to the discovery of the spill, there is no information available regarding the effectiveness of the recovery system, the quantities of diesel fuel recovered, or any confirmatory soil or groundwater sampling.

Mr. Weeber of the IPHD sent a letter to International Harvester noting appreciation of the efforts of International Harvester and the C.B.& Q. Railroad who made excavations from which oil could be pumped out, even though the International Harvester Farmall Works had nothing to with the problem (Weeber, 1964b). Mr. Weeber observed oil burning in the excavation and stated that it is a satisfactory method of controlling the oil if it does not affect the tractors parked nearby (Figure 2)(Weeber 1964b).

The IEPA conducted several inspections in the Sylvan Slough between July and November 1992 in response to complaints of oil seeps in the vicinity of the Sylvan Slough site. In two IEPA internal memorandums dated September 10, 1992 and November 24, 1992, the IEPA discussed a source of complaints regarding oil releases in an area located approximately 600 feet upstream of the Iowa Interstate Railroad bridge to the Rock Island

Arsenal Island. A periodic oily discharge, which exhibited a strong fuel oil odor, was reportedly seeping out of the stream bank from an apparent outfall or seepage face covered by debris (IEPA 1992b). A plume of oil was noted in this area on the surface of Sylvan Slough along the shoreline during the September 24, 1992 IEPA site inspection. The Iowa Interstate Railroad depot and maintenance area (formerly owned and operated by the Rock Island Railroad) is located due south (upgradient) of this area and was reported to be a likely contributor to this outfall (IEPA 1992a). In addition, old building plans indicate that there may be an old sewer outfall to Sylvan Slough which could represent a conduit for the diesel fuel to the Sylvan Slough (IEPA 1992b). (The location of this sewer line was later confirmed [IEPA 1993b].)

Subsequent to the findings of its November 24, 1992 inspection, the IEPA notified Navistar, Burlington Northern, Iowa Interstate Railroad, and Midway Oil about its investigation of the oil discharges to Sylvan Slough. A meeting and site inspection regarding the oil discharges to Sylvan Slough was held on January 26, 1993. During the meeting, the IEPA recommended that the potentially responsible parties (PRPs) agree to take action to eliminate the discharge of oil to Sylvan Slough by participating in the Illinois Pre-Notice Program (formerly Illinois Voluntary Cleanup Program). In the opinion of the IEPA, one of the major areas of environmental concern appeared to be the area which is upstream of the railroad bridge (IEPA 1993a). Navistar and Burlington Northern entered into an Agreed Order with the USEPA address the problem and the Iowa Interstate Railroad declined to participate in a letter to the USEPA dated April 19, 1993.

On February 4, 1993, an oil release was observed in the vicinity of the Sylvan Slough site. On February 8, 1993, the Coast Guard and City of Rock Island located the old sewer system on the BNSF property (Figure 2). Four manholes, which were apparently part of this system, were observed. Oily odors were reportedly evident in three of the four manholes while oil was present in two of the four manholes. The IEPA once again implicated the massive 1964 release of diesel fuel at the Iowa Interstate (Rock Island Railroad) property to be a potential source of the oil found in the manholes at the BNSF property (IEPA 1993b). Burlington Northern agreed to respond to the release but indicated that they were not assuming liability for the spill (Kammueller 1993). Oil and water were removed from the northernmost manhole on the BNSF property, which was sealed with concrete to prevent further discharges to the slough. An inflatable jetter ball was also placed in the outfall to the slough.

On October 18, 1993, representatives from Navistar, BNSF, and Geraghty & Miller performed a visual inspection of the Navistar, BNSF, and QCIC properties (former Farmall site). Particular attention was paid to the Navistar and BNSF properties located west of the QCIC where the most significant oil seepage into the Sylvan Slough was observed by the IEPA in late 1992 (IEPA 1992b).

During the October 18, 1993 inspection, Geraghty & Miller observed numerous stained surface areas that were apparently residuals from the Midwest Flood. During the 1993 Midwest Flood, the water level of Sylvan Slough was within 2 to 3 feet of the elevation of the roadway that runs along the north side of the QCIC. In addition to the numerous stained surface areas, Geraghty & Miller observed three pipe conduits near a concrete building foundation in the center of the BNSF property. The BNSF representative at that time did not have any knowledge of either the nature of the building that had formerly existed on the foundation or the pipe conduits.

Another area of note that Geraghty & Miller observed during the inspection was the location of a former railroad roundhouse and turntable foundation in the eastern half of the BNSF property. This former roundhouse and turntable had been used for the repair and maintenance of BNSF railcars and locomotives. Burlington Northern verified the integrity of their fuel oil lines at the time of the Rock Island Railroad spill, and found none to be leaking (Giallombardo, November 1964).

During the October 18, 1993 site inspection, Geraghty & Miller identified another former railroad roundhouse and turntable and the former and current oil storage tank located on the Iowa Interstate property to the south of the BNSF property. Based on Geraghty & Miller's review of historical aerial photographs and Sanborn fire insurance maps, the former Rock Island Railroad roundhouse facility was much larger than the former BNSF roundhouse facility.

Geraghty & Miller's Initial Site Investigation (1994) at the Navistar/BNSF Properties concluded that the Rock Island Railroad site is the known source of oil discharges to the Sylvan Slough. This conclusion was based on the results of a groundwater investigation which revealed the presence of polynuclear aromatics (PNAs) and free product in wells upgradient of the Sylvan Slough site immediately adjacent to the Iowa Interstate property. The known release of oil from an AST at the Rock Island facility in 1964 appeared to be the original source of the oil discharges.

A pumping test completed by Geraghty & Miller in September 1995 discovered the presence of a local confining clay layer beneath the Navistar property and most of the Burlington Northern property, but it does not extend beneath the Iowa Interstate property. It was noted that the majority of the oil at the site was likely located beneath the confining clay layer.

The presence of oil beneath the clay layer supports the interpretation that the release of oil occurred south (upgradient) of the southern extent of the clay layer. The presence of the clay and the natural buoyancy of the oil would prevent the downward migration of oil through the clay at the Navistar and Burlington Northern properties. As discussed later in this report, it is believed that the oil was present south of the Burlington Northern property in sufficient thickness and depth to migrate downgradient both above and beneath the clay. When the oil migrated downgradient to the location where the clay is present, the oil migrated both above and below the clay towards the slough. The only known petroleum release that occurred upgradient of the Sylvan Slough site is the 1963-1964 Rock Island Railroad oil spill.

3.0 FIELD WORK

Geraghty & Miller performed additional field work at the Sylvan Slough site to gather remediation design data. As part of the field work, Geraghty & Miller performed a cone penetrometer/rapid optical screening tool (CPT/ROST) study, installed 20 recovery/monitor wells, abandoned 5 wells, completed a pilot test, conducted baildown tests at selected wells, and collected site wide water/product level measurements. This section provides a description of the methodologies used during the investigative activities.

3.1 CPT/ROST STUDY

Cone penetrometer testing (CPT) was conducted at twenty-nine locations in December 1995. The CPT provides a log of the stratigraphy at each location based upon the soil resistance measurements. The CPT consists of pushing a small diameter, instrumented probe (penetrometer) into the ground at a constant rate while a data acquisition system analyzes the soil response to penetration. The soil resistance to penetration is measured on the tip and along the sides of the penetrometer. The penetrometer is mounted on a string of sounding rods. A hydraulic ram is used to push the sounding rods/penetrometer assembly into the ground. The hole is sealed with bentonite from the top of the penetrometer to the surface while the tool is advanced. When the tool is retracted, bentonite is pumped below the penetrometer through a bypass valve to seal the hole. The stratigraphic logs from the CPT study are provided in Appendix B.

The ROST provides a vertical log of the estimated amount of hydrocarbons present at each location simultaneously with the CPT. The ROST can also determine the general type of aromatic hydrocarbon present, and at this site it was determined that the hydrocarbons are diesel-like. The ROST uses a pulsed laser light directed through a sapphire window in the penetrometer tool into the surrounding soil, and aromatic petroleum hydrocarbons present in the soils will absorb the light and emit the absorbed energy as fluorescence. The ROST fluorescence intensity was converted to Total (Recoverable) Petroleum Hydrocarbons (TPH) (EPA Method 418.1) using a regression analysis between soil sample results and ex-situ ROST fluorescence intensity on the soil samples. The integrated CPT/ROST results are provided in Appendix B.

3.2 WELL INSTALLATIONS

Recovery/monitor well installation began on September 19, 1996, and was completed on October 8, 1996. Ten shallow wells and ten deep wells were installed along Sylvan Slough, as shown on Figure 3. Drilling activities were performed by Geotechnical Services Inc. (GSI) of Bettondorf, Iowa under the supervision of a Geraghty & Miller geologist.

Shallow wells were installed using a truck-mounted Mobile model B-50 drill rig. The shallow wells were installed to the top of a 1 to 5 feet thick clay layer, approximately 16 to 20 feet below land surface (bls). The shallow wells were constructed of 2-inch diameter PVC casing with 10 feet of 20-slot PVC screen. The deep wells were installed using a truck-mounted Mobile model B-61 drill rig. The deep wells were installed as double-cased wells through the clay layer. An 8-inch diameter, steel casing was placed approximately 1 ft into the clay layer, and cemented in place. A 2-inch diameter PVC well was installed within the steel casing. The deep wells were also constructed with 10 ft of 20-slot screen. In the deep wells, the top of the screen was placed at the bottom of the clay layer. Seventeen wells were completed 2 feet above ground surface, and finished with a 6-inch diameter, PVC protective casing. Three wells were completed with a flush-mounted steel manhole cover, because they are located within the railroad tracks or in traffic areas. Monitor well boring logs are provided in Appendix D.

3.3 PILOT TEST

The pilot test system was started on September 19, 1996, and was operated for approximately one month. The pilot test was interrupted for approximately one week to allow the electricity to be turned off to accommodate recovery and monitoring well installations. The system continued to operate at the close of the pilot period.

The pilot test recovery wells were RW-4, RW-5, RW-6, and RW-7. Each well is equipped with a pneumatically operated bladder pump controlled by a cycle timer/pressure regulator. The compressor in the equipment building provides the air pressure to operate the pumps. During the pilot test period, approximately 40 gallons of oil was recovered. The system operated as designed. No leaks were observed in the system piping.

Fluid levels were measured in each of the recovery wells weekly for four weeks. The fluid levels in each of the piezometers and wells adjacent to the recovery wells (i.e., GM-30, GM-31, GM-32, GM-20S and GM-20D) were also measured weekly for four weeks. The oil layer in the test wells was maintained at less than 0.20 ft.

3.4 BAIL TESTING

Bail tests were conducted at selected site wells. Initial depth to oil and water measurements were recorded, prior to the start of each bail test. A polyethelene bailer was used to remove the oil to the maximum extent possible. Once the oil was removed, depth to oil and water measurements were recorded at one minute intervals for the first five minutes. Then, the frequency of measurements was reduced to every five minutes until the first half hour had elapsed. The measurement frequency was then reduced to once every fifteen minutes until the end of the first hour. If sufficient oil had accumulated in the well, the test was repeated. If not, the test was continued for a total time of four hours. During the last three hours, hourly measurements were recorded. The test results provide a qualitative indication of the recoverability of oil at a particular well.

RW-4, RW-5, RW-6, and RW-7 were bail-tested on September 28, 1996. GM-32 was tested on September 29 and October 6, 1996. GM-J2 and GM-C2 were tested on October 15 and 16, 1996, respectively. GM-24D, GM-25D, and GM-28D were tested on October 17, 1996. GM-J2 returned to initial levels four hours from test start. GM-24D returned to initial levels between two and three hours from test start. The other nine wells did not recover within the four hour test time frame.

GM-20D was bail-tested three times, twice on September 29, and once on October 16, 1996. GM-I1 was tested three times, twice on October 16, and once on October 17, 1996. Both these wells recovered within the first hour of each test.

3.5 WATER LEVELS

In conjunction with the pilot test fluid level measurements, weekly fluid level measurements were collected at all existing monitoring wells and staff gauges. An oil/water interface probe was used to collect measurements from the wells with product. Wells with no product were measured with a standard electric water level probe. Each probe was decontaminated with a soap and water rinse, and then a distilled water rinse between measurements. Water level measurements were collected on September 29, October 6, October 13, and October 18, 1996.

4.0 SITE CHARACTERIZATION

Free-phase oil intermittently seeps from the base of the bank into the slough where it forms an iridescent film on the water. The geologic and hydrogeologic characteristics of the site are described below as are conditions which may allow oil seepage into the Sylvan Slough. Areas of subsurface oil accumulation at the Sylvan Slough Removal Action Site are also identified based on data obtained during the pre-design study and the Phase I oil recovery system implementation.

4.1 GEOLOGY

The site is underlain by fill in the area immediately adjacent to the river. The fill is composed of fine- to medium-grained foundry sands, with lesser amounts of crushed glass, slag and timber as observed in samples collected from soil borings completed at the site. The latter materials are estimated to comprise less than 5% of the total composition of the Upper Fill Unit. The Upper Fill Unit is up to 26-feet thick adjacent to the slough (i.e., north) but becomes thinner to the south.

The Upper Fill Unit is locally underlain adjacent to the slough by a stiff to dense, olive green, silty clay unit (i.e., the Confining Clay). Abundant rootlets have been observed in samples collected from the top of the Confining Clay. The extent and structure of the Confining Clay Unit has been evaluated by description of soil cores collected from soil borings and by the cone penetrometer testing (CPT) conducted at twenty-nine locations in December 1995. A summary of the elevations of the upper and lower limits of the Confining Clay encountered at each CPT boring is presented in Table 2.

The Confining Clay ranges from one foot to greater than five feet in thickness in the zone adjacent to the river, and thins to the south. The surfaces defined by the elevations of the upper and lower limits of the Confining Clay are irregular. The structure of the lower surface (i.e., the bottom elevation) of the Confining Clay is estimated on

Figure 4. The structural contour map of the base of the clay indicates that there are several areas where the base of the clay is shallower than in other areas. It appears that the Confining Clay extends into the slough to form the river bed close to the bank. The Confining Clay is absent in the vicinity of sounding CPT-14 (Figure 4 and Table 2). South of the east-west line of CPT soundings from CPT12 (west) to CPT-18 (east), the Confining Clay pinches out (i.e., absent), indicating that the Confining Clay does not extend beneath the Iowa Interstate property.

The Lower Sand and Gravel Unit underlies the Confining Clay, and contains sand and gravel with shell fragments, and pebbles of limestone, sandstone, shale and various igneous rocks. The Lower Sand and Gravel Unit is alluvial in origin and frequently contains discrete horizons of larger-sized material surrounded by finer-grained, mixed sand and gravel deposits. The Lower Sand and Gravel Unit is thickest adjacent to the slough and becomes thinner to the south and appears to eventually pinch out (absent) to the south.

The Lower Sand and Gravel Unit is underlain by a bedrock valley. Shale bedrock was found at approximately 530 feet MSL adjacent to the slough, at about 556 feet MSL beneath the Iowa Interstate property, and the shale was found at about 561 ft MSL south of the Iowa Interstate property. The shale slopes upward away from the slough forming a buried bedrock valley beneath the unconsolidated materials.

4.2 HYDROGEOLOGY

Groundwater level measurements indicate that approximately three feet of the Upper Fill Unit above the Confining Clay are water saturated (Table 1). The fluid level data in Table 1 has been corrected, where appropriate, for the presence of oil using an oil density of 0.875 (Appendix C). The saturated thickness of the unconsolidated materials in the unconfined zone increases to 7 to 10 ft south of where the Confining Clay is absent. Horizontal hydraulic gradients in the Upper Fill Unit are generally from south to north towards the slough. The fill is unconfined with an estimated hydraulic conductivity of 20 ft/day. Hydraulic heads in the Upper Fill Unit are typically greater than those in the Lower Sand and Gravel Unit resulting in a potential for groundwater flow from the Upper Fill Unit to the Lower Sand and Gravel Unit. However, the hydraulic conductivity of the clay unit is low, so the groundwater flux between the two units is expected to be small (Geraghty & Miller, 1995b).

The Lower Sand and Gravel Unit below the Clay Confining Unit is fully saturated based upon the water level data from the site wells (Table 1). Hydraulic heads are above the base of the overlying clay, reflecting the confined nature of the Lower Sand and Gravel Unit. It is possible that small portions of the Lower Sand and Gravel may become unsaturated at low stages in the river. The elevation of the bottom of the Confining Clay Unit between map grid coordinates approximately 14,750 feet east and 14,830 feet east is within the lower range of fluctuation (approximately 549 to 550 ft msl) in the Mississippi River locally (Figure 4). It is possible that the water level in the slough will sometimes go below the bottom of the clay in this area where the clay is shallowest. Inspection of the daily average stage data for the Mississippi River for the years 1994 through 1996 indicates that the average water level may go below 550 ft MSL an estimated 35% to 50% of the time, below 549 ft MSL an estimated 15% to 25% of the time, and below 548 ft MSL an estimated 5% to 15% of the time (Appendix A).

Horizontal hydraulic gradients in the Lower Sand and Gravel Unit are generally from south to north towards the slough, but short term gradient reversals are possible at times of high river stage. The horizontal hydraulic conductivity of the Lower Sand and Gravel Unit is estimated to be 450 ft/day (Geraghty & Miller, 1995b). Hydraulic gradients in the Lower Sand and Gravel Unit are an order of magnitude lower than in the Upper Fill Unit due largely to the relatively greater hydraulic conductivity of the Lower Sand and Gravel compared to the Upper Fill.

The hydraulic conductivity of the Confining Clay Unit was not measured directly, although indirectly a vertical permeability of 0.03 ft/day was determined from pumping test data. The clay unit is regarded as a confining unit where present, because it impedes flow between the Upper Fill and the Lower Sand and Gravel Unit (Geraghty & Miller, 1995b).

4.3 OIL SHEEN OCCURRENCE

Geraghty & Miller has reviewed 1994 through 1996 Coast Guard inspection records of oil sheen occurrences at the Sylvan Slough Removal Action Site as well as precipitation and daily average river stage records for the same period to evaluate the potential interrelationships and gain further understanding as to the mechanism(s) allowing oil sheens on the Sylvan Slough.

Coast Guard inspections were conducted on a total of 44 days during the three year time period reviewed. The Coast Guard recorded observations as to the presence or absence of an oil sheen at the time of each inspection (Appendix A). A chart of daily precipitation and daily average river stage has been prepared for each of the three years (Appendix A). The Coast Guard inspection dates and notations (S = oil sheen, NS = no oil sheen) concerning the occurrence of an oil sheen are also recorded on the charts. The daily average river stage data was provided by the Army Corp of Engineers and the precipitation data was provided by the National Climatic Data Center (Appendix A). The river stage data discussed below and plotted on the charts are based on a gage elevation referenced to a 1912 datum. The datum was updated in 1929 requiring that 0.44 ft be subtracted from elevations referenced to the 1912 datum. Other land surveying elevations determined for the site, such as measuring point elevations and ground surface elevations at the monitoring wells, are based on the 1929 datum.

There is no apparent relation between precipitation events and the occurrence of an oil sheen based on review of the charts in Appendix A. The oil sheen occurrences appear to occur on a random basis with respect to precipitation events.

A chart summarizing descriptive river stage statistics (mean, variance, rank, percentile, etc.) for the set of days corresponding to the Coast Guard inspections is presented in Appendix A. It is apparent that there is a tendency for oil sheens to occur more frequently when the river stage is less than the median (549.69 ft MSL or 6.3095 when stage elevations are transformed to natural logarithms) shown by the more frequent shaded results with ranks of 23 to 44 in the listing of river stage ranks and percent.

Statistical hypothesis testing was conducted to evaluate whether or not the two river stage sample groups (oil sheen or no oil sheen) belong to the same population. Data analysis tools in Microsoft Excel ™ were used to perform the evaluation. The means of the two sample groups were compared for this purpose using both a Student's T-test and analysis of variance (ANOVA) which provide equivalent tests but with different output information that can be instructive. Output from the statistical analysis routines are shown in Appendix A. River stage elevations were converted to their natural logarithms (base e) to produce a more normally distributed (symmetrical) data set prior to conducting the statistical analysis. The mean river stage for days when an oil sheen was observed is 549.38 ft MSL (6.3088 base e) and 550.69 (6.3112 base e) on days when no oil sheen was observed. The T-Test and ANOVA rejected the hypothesis that the two means are equal at a significance level of 0.05. Thus, there does appear to be a greater probability of an oil sheen at relatively lower river stages. This is consistent with the conceptual model for entrapment of oil in the subsurface and release of oil into the Sylvan Slough as discussed in Section 4.2, Hydrogeology. Other factors besides river stage are also involved in determining whether an oil sheen occurs at a particular time since the Coast Guard inspections records show that an oil sheen does not always occur when the river stage drops below a certain level.

It is likely that a complex sequence of events results in a build up of oil in structurally high areas below the Confining Clay followed by conditions allowing continued oil migration toward the slough. The sequence and duration of changes in potentiometric surface position in the Lower Sand and Gravel Unit, river stage and the number of days since the previous release to the slough are some of the possible factors affecting oil sheen occurrences.

4.4 ESTIMATED DISTRIBUTION OF OIL

Free-phase oil can be found in discrete areas in both the Upper Fill Unit and the Lower Sand and Gravel. The distribution of free-phase oil was estimated during the pre-design study through fluid level measurements in monitoring wells and also using CPT coupled with a rapid optical screening tool (ROST). The measurements of free-phase oil thickness' in water table monitoring wells overestimates the thickness of oil in the aquifer (Testa and Paczkowski, 1989, Ballestero et al., 1994). As a general rule of thumb, the thickness of oil in the aquifer is about four times less than the thickness of oil measured in the monitoring well under steady-state conditions (Abdul et al., 1989, Lenhard and Parker, 1990). The relationship between the thickness of oil measured in a well and the actual oil thickness is dependent on a number factors including the grain size distribution of the aquifer and the rise and fall of the water table (Testa and Paczkowski 1989, Marinelli and Durnford,1996).

The relationship between the thickness of oil in a well versus the actual oil thickness is different for a confined aquifer situation as compared to a water table situation, because a confined aquifer does not have exaggerated apparent oil thickness due to capillary fringe affects. To estimate the thickness of oil in a confined aquifer from monitoring well measurements, a correction must be made for the hydrostatic head. The height of the oil in the well above the base of the confining layer is subtracted from the total thickness of oil measured in the well to obtain an estimate of the actual thickness of oil in the confined aquifer (Trimmell, 1987). This method is designed to be used where the oil water interface in the well is located below the bottom of the confining layer. There is no method currently available to estimate the actual thickness of oil in a confined aquifer from monitoring well measurements where the oil water interface in the well is above the bottom of the confining layer. In the following discussions that include measured thickness' of oil in wells, the reader should keep in mind that the thickness of oil in the aquifer unit will likely be substantially less than the amount measured in the well.

As discussed previously, a CPT/ROST study was conducted at twenty-nine locations (Figure 4) at the site to better define the structure of the clay and locate areas with high potential for oil accumulation. The ROST provides a vertical log of the estimated amount of hydrocarbons present at each location simultaneously with the CPT. The ROST can also determine the general type of aromatic hydrocarbon present, and at this site it was determined that the hydrocarbons are diesel-like. The integrated CPT/ROST results are provided in Appendix B.

4.4.1 Upper Fill Unit

The estimated distribution of potentially recoverable oil in the Upper Fill Unit, based upon the maximum TPH values (i.e., >10,000 ppm) in the Upper Fill Unit for each CPT location and the presence of oil measured in existing monitoring wells during the pre-design study, is shown on Figure 5. Feenstra et al., 1991 stated that concentrations above 10,000 ppm are indicative of the presence of a free-phase. Five areas (A through E) of potentially recoverable oil shown on Figure 5 were identified, based on the pre-design study data. The lateral extent of the areas of potentially recoverable oil were re-evaluated based on measurements of the presence of free phase oil made more recently after completing the additional well installations which constitute the Phase I oil recovery system implementation (Figure 6).

Area A was interpreted to be located partially on the Iowa Interstate Property and partially on the Navistar/BNSF properties, based on the pre-design study data (Figure 5).

The CPT/ROST data collected in Area A indicated the potential presence of oil at each of the CPT locations potentially ranging in thickness from 0.1 ft (CPT21, CPT22) to 4 ft (CPT20A) (Appendix B). The southern extent of Area A is estimated to be approximately 50 feet south of the above ground oil storage tank area based on the CPT/ROST data (Figure 5). North of Area A, the maximum TPH levels are less than 10,000 ppm at CPT 12 (100 ppm), CPT6 (3800 ppm), CPT28 (2700 ppm), CPT14 (8900 ppm), CPT15 (8700 ppm), CPT16 (1900 ppm), CPT17 (100 ppm), CPT18 (100 ppm), and CPT11 (200 ppm), indicating that migration of oil through the Upper Fill Unit in this area towards the slough is not the current, primary mechanism for oil to migrate to the slough. The northern limit of Area A has been moved to the south as shown on Figure 6, based on measurements to detect free-phase oil made in several new monitoring wells. The new wells were installed in September 1996 as part of the Phase I oil recovery system implementation. No free-phase oil was detected in Wells GM-A1, GM-A2, GM-A3, GM-B1 and GM-B2 during October and November 1996, and January 1997. Oil was observed in each of the pre-existing wells in Area A [GM-1 (0.8 ft), GM-2 (0.63 ft), GM-3 (4.28 ft), GM-4 (0.02 ft), GM-9 (0.26 ft), and GM-10 (0.61 ft)] during the January 1997 monitoring event (Figure 6 and Table 1).

Area B is located along a portion of the active BNSF railroad spur (Figure 5). The CPT/ROST data obtained during the pre-design study indicate that the oil thickness in Area B may range from 0.1 ft (CPT31A) to 0.4 ft (CPT9). No wells screened only in the Upper Fill were present in Area B at the time of the pre-design study to confirm the presence of recoverable amounts of oil. No free-phase oil has been present in the two new monitoring wells (GM-B1 and GM-B2) installed as part of the Phase I oil recovery system implementation in Area B (Figure 6 and Table 1). Therefore, Area B is no longer designated as a hydrocarbon accumulation area.

Area C is also located along a portion of the active BNSF railroad spur (Figure 5). In Area C, the CPT/ROST data indicate an oil thickness of approximately 0.2 ft (CPT4) to 0.7 ft (CPT10) (Appendix B). Oil has been measured in well GM-6 up to 3.53 ft (Table

1). Well GM-24S is located at the western edge of Area C and an oil layer up to 0.17 ft thick has been observed in the well (Table 1). The limits of Area C have also been modified based on measurements to detect free-phase oil in several new monitoring wells installed in September and October 1996 (Phase I Implementation). Measurable accumulations of oil have been found in Well GM-C2, one of two monitoring wells installed as part of the Phase I implementation in Area C (Figure 6 and Table 1). However, no free-phase oil has been detected in Well GM-C1 (Figure 6 and Table 1). Area C has been extended west to include other adjacent Upper Fill monitoring wells with free-phase oil accumulations including Wells GM-28S, GM-29S, and GM-D1 (Figure 6). Oil has likely migrated to these locations from Area A at the water table in the Upper Fill Unit. Oil present at these locations may also be related to migration directly from the Lower Sand and Gravel through weaknesses in the Confining Clay.

Area D was initially interpreted as an isolated location based solely on CPT/ROST data (Figure 5). The CPT/ROST data obtained during the pre-design study indicate an oil thickness of approximately 0.5 ft (CPT30) in Area D. Well GM-D1 was installed in September 1996 and confirmed the CPT/ROST data for Boring CPT30. In January 1997, 0.53 ft of free-phase oil was measured in Well GM-D1. The GM-D1 location appears to be part of the Area C oil accumulation as discussed above, and therefore, the Area D designation is no longer used (Figure 6).

Area E was interpreted during the pre-design study as a relatively small, isolated location as shown on Figure 5. At the time of the pre-design study, there were no wells screened only in the Upper Fill in Area E to confirm the presence of recoverable amounts of oil. Oil has been measured in Well MW-9 up to 6.5 ft thick (Table 1). Well GM-E1 was installed in September 1996 during the Phase I implementation as an Upper Fill monitoring well (Figure 6). A 0.21 ft thickness of free-phase oil was detected in Well GM-E1 during the January 1997 monitoring event (Table 1). Oil has likely migrated to this area directly from Area A at the water table in the Upper Fill Unit. Oil present may also be related to migration directly from the Lower Sand and Gravel through weaknesses in the Confining Clay. The former burn pit is also located in this area and the dep burn pit excavation is not known.

4.4.2 Lower Sand and Gravel Unit

The estimated distribution of potentially recoverable oil (Areas G to I) in the Lower Sand and Gravel Unit (plus Area F which is suspected of having only residual levels of oil), at the time of the pre-design study, is shown on Figure 7. The lateral extent of the areas of potentially recoverable oil were re-evaluated based on measurements to detect the presence of free-phase oil made more recently after completing Phase I of the oil recovery system implementation (Figure 8). Each of the areas thought to contain oil are located in areas where the base of the clay is relatively shallow (i.e., a structural high in the base of the clay).

Given the geology and hydrogeology of the site, the only reasonable explanation for the quantity and distribution of oil beneath the Confining Clay Unit on the Sylvan Slough Removal Action Site is a major release of oil to the subsurface in an upgradient area where the Confining Clay is not present. The site history and subsurface investigation data indicate that the oil migrated from Area A where the confining clay is not present to beneath the Confining Clay Unit due to downward displacement of water by the oil at the time of the 1963/1964 Rock Island Railroad diesel fuel spill. The USEPA (1995) describes this downward displacement mechanism. The weight of a large amount of spilled oil most likely displaced water downward so that the oil was deep enough to migrate below the clay. The oil below the clay then migrated towards the slough in the Lower Sand and Gravel Unit, where it discharged at the bank of the slough. Because the Lower Sand and Gravel Unit is currently a confined aquifer, the residual oil currently present may have migrated to the structural highs in the clay due to its natural buoyancy, forming discrete pockets of accumulated oil.

In Area F, the maximum TPH values were less than 10,000 ppm (CPT8, CPT13, CPT28 and CPT31) (Figure 7), and thus, only residual non-recoverable oil was believed to be present in Area F at the time of the pre-design study. Wells GM-F1, GM-F2 and GM-F3 were installed during September and October 1996 to further evaluate the potential for free-phase oil in Area F (Phase I Implementation). No free phase oil has been detected in the F-series monitoring wells which indicates that only residual amounts of hydrocarbons are present as a result of a previous migration of oil through the area (Table 1). Therefore, the Area F designation is no longer used (Figure 8).

The designated limits of Area G at the time of the pre-design study are shown on Figure 7, based on detected oil in Well MW-9, reports of intermittent seeps into the slough at the northern boundary of the area, and the interpreted configuration of the elevation of the bottom of the Confining Clay Unit (Figure 7). The CPT/ROST data obtained during the pre-design study also indicated the potential oil thickness to range from not present (CPT1) to 0.4 ft (CPT6)(Appendix B) (Figure 7). New information following installation of three new monitoring wells (GM-G1, GM-G2 and GM-G3) during the Phase I implementation has been used to modify the horizontal extent of Area G. The modified Area G limits are based on the revised configuration of the lower surface of the Confining Clay (Figure 4 and Figure 8) and measurements to detect oil in the three new G-series wells (Figure 8 and Table 1). Of the three new wells in Area G, oil was detected only in Well GM-G3 (0.98 ft). In this area, the elevation of the bottom of the Confining Clay Unit is within the range of fluctuation in the Mississippi River locally. It is possible that the water level in the slough will sometimes go below the bottom of the clay, where the clay is shallowest (a length of shoreline estimated at 25 to 50 ft) (Figure 8).

Area H is known to contain oil and intermittent seeps have been reported at the northern boundary of this area. Up to 6.41 ft of oil has been observed in well GM-20D. The CPT/ROST data obtained during the pre-design study for Area H indicate the oil thickness may range from 0.2ft (CPT2) to 1.6 ft (CPT7b) (Figure 7). Minor revisions to the horizontal limits of Area H established during the pre-design study were made based on subsequent data from installation of several new wells including GM-PZ33, GM-RW-5, GM-RW-6, GM-RW-7, GM-30, GM-31, and GM-32 during the Phase I implementation (Figure 8). The clay in this area is not as shallow as that in Area G, but with the bottom of the clay expected to be at about 549 ft MSL, the water level in the slough has been recorded to go below the bottom of the clay in a limited area (an estimated 50 ft of shoreline).

Area I had previously been defined based on the presence of oil in Wells GM-24D and GM-25D (Table 1). Measurements taken from wells GM24D and GM25D indicate oil thickness' up to 6.91 ft and 6.41 ft, respectively (Table 1). The distribution of free phase oil in Area I was further evaluated by installation of Wells GM-I1 and GM-I2 in September and October 1996. The revised limits of Area I are shown on Figure 8. Area I consists of two subareas, east and west of Well GM-I2, which has not had oil detected. The eastern subarea includes Well GM-25D (Figure 8). The western subarea contains several wells with measurable free-phase oil including Wells GM-23D, GM-24D, GM-28D, GM-29D, GM-I1 and RW-1 (Figure 8). The bottom of the clay is slightly deeper at Area I as compared to other areas of the site, and no seeps have been reported at this location. The shallow portion of the bottom of the clay in this area is estimated to be approximately 548 ft MSL, and the water level in the slough may occasionally go below this level over an estimated distance of approximately 100 ft of shoreline.

Area J is located south of Area I at a structural high in the Confining Clay Unit (Figure 7). Oil has been observed in well GM-6 up to 3.53 ft thick (Table 1). The CPT/ROST data for CPT10 obtained during the pre-design study indicates a potential oil thickness of 0.7 ft. Wells GM-J1 and GM-J2 were installed to further evaluate the distribution of free-phase oil in Area J during the Phase I implementation in September and October 1996. The limits of Area J were revised as shown on Figure 8, based on recent fluid level measurement data which shows 6.35 ft of oil in Well GM-J2 , but, no oil in Well GM-J1.

5.0 CONCEPTUAL APPROACH TO FULL SCALE IMPLEMENTATION

The goal of the removal action is to prevent the discharge of free-phase oil into the Sylvan Slough. This will be accomplished by the removal of free-phase oil from the Upper Fill Unit and the Lower Sand and Gravel Unit by utilizing a passive oil recovery well system. Passive oil recovery involves the active collection of oil, but without a hydraulic gradient induced through groundwater extraction. This approach was presented in the November 15, 1995 "Alternative Evaluation Technical Memorandum" and approved by the U.S. EPA in a letter dated December 1, 1995 (USEPA 1995).

This approach was selected for the Upper Fill Unit because the saturated thickness is thin making gradient control difficult and the potential exists that pumping water would be less efficient in oil removal over the long term due to "bypass trapping" of the oil and a reduction in transmissivity as the oil layer thins. Bypass trapping of oil occurs when moving water disconnects the flow of oil, reducing the mobility of the oil. In the Upper Fill Unit, the removal of oil from the recovery well induces a small gradient towards the well by creating a potential difference between the level of oil in the Upper Fill Unit and in the recovery well.

Passive oil removal was selected for the Lower Sand and Gravel because the unit is a confined aquifer, highly transmissive, and the structure of the confining clay presented the opportunity to utilize natural gradients to collect the oil in wells. In addition, pumping water to remove the oil would be less efficient in oil removal (i.e., more nonrecoverable oil left in place) over the long term, due to "bypass trapping" of the oil (USEPA). The bottom surface of the Confining Clay is shallower in some areas, allowing the free-oil to accumulate in discrete pockets or traps. Recovery wells will be installed in these areas to take advantage of the natural buoyancy of the oil. The system to be installed in the Lower Sand and Gravel will utilize the hydraulic gradient induced by the density differences between the oil and water and is given by Cohen and Mercer (1993) as:

Hydraulic Gradient = (Oil Density-Water Density) / Water Density

-0.125 = (0.875-1)/1 (Sylvan Slough example estimate)

The sign is negative because the gravity-induced hydraulic gradient will cause the oil to migrate upwards towards the recovery wells screened in the Lower Sand and Gravel.

In any free-phase oil recovery situation, a portion of the oil will be retained in the formation materials as non-recoverable oil, because the oil becomes immobile at low saturations (Testa and Paczkowski, 1989, USEPA 1995). This residual oil is trapped as small, immobilized, disconnected pockets of liquid within the unit (Conrad et al., 1992). Residual non-recoverable oil and the associated dissolved constituents will be mitigated through natural attenuation processes. As groundwater migrates past the residual oil, a portion of the oil will enter the dissolved phase (Conrad et al., 1992). The dissolved phase will be subjected to natural attenuation mechanisms including biodegradation, dispersion, sorption, and volatilization, with the most important mechanism for the attenuation of petroleum hydrocarbons in the subsurface being biodegradation (Mobil Oil, 1995, McAllister and Chiang, 1994). The presence of free-phase oil tends to inhibit biodegradation in locations where the free oil is present. The removal of the free-phase oil will improve the conditions for natural attenuation in the vicinity of the areas where oil is currently present.

The volume of trapped residual oil can range from 10% to 20% of the porosity of the unsaturated zone and 10% to 50% of the porosity in the saturated zone (Cohen and Mercer, 1993) (i.e., residual saturation). In the unsaturated zone, this residual saturation is due to capillary forces. In the saturated zone, the oil is often trapped by "bypassing," where moving water disconnects the flow of oil and reducing the oil's mobility. Removal of oil through passive recovery wells should minimize the potential for bypassing to occur, because water is not being accelerated past the oil in the formation by pumping. The remaining residual, non-recoverable oil will be slowly diminished by dissolution, volatilization and to some extent, biodegradation (Cohen and Mercer, 1993).

In the USEPA's Advance Notice of Proposed Rulemaking (61FR 19432), the agency states that three major programs, Superfund, RCRA Corrective Action and Underground Storage Tanks, recognize that natural attenuation, can be an acceptable component of remedial actions for contaminated groundwater. McAllister and Chiang (1994) reported that natural attenuation can significantly reduce the potential impact of a petroleum hydrocarbon release. If sufficient oxygen is available (> 1 to 2 mg/l), the petroleum compounds can be most readily degraded aerobically (Vroblesky and Chapelle, 1994). If the oxygen concentration in the groundwater is depleted, the petroleum compounds can be anaerobically degraded, but at a slower rate than aerobic biodegradation (McAllister and Chiang, 1994). Vroblesky and Chapelle (1994) found that petroleum hydrocarbons degrade best under aerobic conditions, but biodegradation also occurs under methanogenic, sulfate-reducing, ferric iron reducing, and nitrate reducing conditions, and many of these conditions may be occurring at the same time at different locations in a single plume.

API (1996) identifies five approaches for addressing residual hydrocarbons: soil venting, air sparging, excavation, surfactants, and bioremediation. Venting requires an unsaturated zone, and works bests with volatile petroleum hydrocarbons such as gasoline. At this site, the petroleum hydrocarbons are less volatile diesel range hydrocarbons, and the majority of the oil is present in the saturated zone below the confining layer. Air sparging is also typically used with volatile compounds and in conjunction with a venting system. A venting system below the clay is not practical and again the petroleum hydrocarbons at the site are the less volatile diesel range hydrocarbons. The volume of soil that would require excavation would be large and together with the engineering problems of working at the edge of the slough also make this technology impractical. The use of surfactants is not a proven technology and the surfactants may also be considered a contaminant. The most practical method of addressing the residual hydrocarbons is through natural remediation. Natural remediation occurs to some extent at most sites (API, 1996). The natural processes that are capable of reducing hydrocarbon concentrations include biodegradation, volatilization, adsorption, dispersion, and photolysis.

Because natural attenuation of petroleum hydrocarbons can occur under a variety of conditions, and can significantly reduce the potential impact of a petroleum hydrocarbon release, natural attenuation of the residual free-phase hydrocarbon and the dissolved petroleum hydrocarbons will be used to mitigate the impacts of small amounts of non-recoverable petroleum hydrocarbons and dissolved hydrocarbons at the site.

The general approach for the system implementation is to utilize additional wells (e.g., the Phase I wells) to evaluate the presence or absence of recoverable amounts of oil and subsequently connect areas with recoverable amounts of oil to the existing system. The overall system implementation will be accomplished in three phases. Phase I is an extension of the pilot test followed by connecting wells with recoverable amounts of oil to the existing system. Phase II is an operation and monitoring period during which existing wells are operated and monitored. In Phase III, the need for additional wells will be evaluated as the remediation progresses.

5.1 PHASE I ACTIVITIES

Wells located in areas where recoverable amounts of oil have been found are designated as "recovery wells." These are shallow wells GM-24S, 28S, 29S, C2 and D1; and deep wells GM- 22D, 23D, 24D, 25D, 28D, 32 and RW-I1, J2 and G3. These wells are shown on the Drawing 1. During Phase I, only these wells will be added to the full-scale system. Additional wells may be added to the system during Phase III.

Remaining wells are designated as "monitoring wells" and will not added to the full-scale system during Phase I. These wells are also shown on Drawing 1. A sufficient amount of recoverable oil has not been found in these well locations to warrant converting them to recovery wells at this time. Their purpose will be to verify the absence of recoverable oil.

5.1.1 Above-grade Component Installations

Piping recovery wells to the system will occur during Phase I and potentially during Phase III. The piping approach will be the same under Phase I or III. An aboveground piping system will be used to convey recovered oil to an aboveground storage tank adjacent to the equipment building. The oil piping system (carbon steel) will consist of a main header pipe with laterals to connect individual wells to the main header pipe. The piping system will rest on concrete pipe supports. The Phase I piping layout is shown on Drawing 1. There are two places where the piping will be installed below grade in order to allow for vehicle traffic on the access road. Piping below grade will have secondary containment.

The recovery pumps will be pneumatically powered, bladder type pumps equipped with oleophillic screens controlled by a timer/regulator. The oleophillic screen allows only oil to pass through it to the pump. Each timer/regulator controls the on/off cycle time of the pumps and regulates the discharge of pressurized air to the pumps. Each timer/regulator will be located in the equipment building. Pressurized air for the pumps will be produced by one or more rotary screw type compressors housed in the existing on-site, heated equipment building. The air will be distributed from the compressor(s) to the regulators and from the regulators to the pumps through air distribution lines. Air distribution lines will consist of hard drawn, K-type copper tubing. Oil piping and air lines will be heat traced with self-regulating type heat tracing and insulated with mineral fiber insulation covered with a protective aluminum jacketing. An expansion piping loop will be used to control axial expansion and contraction of the oil piping due to ambient temperature fluctuation.

5.1.2 Containment Boom

A floating containment boom and absorbent boom will be installed in the Sylvan Slough along the shoreline of the site in the event active oil seeps are observed along the seepage face of the embankment adjacent to the slough The embankment will be inspected for evidence of active oil releases during the regularly scheduled site visits for routine system maintenance activities following completion of the removal action. A containment boom with an 8-inch float and 12-inch skirt will be installed with an equal length of oil absorbent boom lining along the inside edge (facing site). The containment boom will be anchored to the shore in areas of active oil seeps. The length of boom will be minimized by only locating it in areas where active seeps are observed. Weekly inspections will be required to determine the integrity of the boom and schedule any maintenance or repairs. The boom will be removed before the slough freezes, and replaced after the ice breaks up.

5.2 PHASE II MONITORING AND MAINTENANCE

The extraction system will be remotely monitored using sensors at the site connected via a phone line to a computer. The computer will be accessed approximately daily to observe the status of the system. When problems are identified, they will be addressed as soon as possible. The system will be inspected on a weekly basis for the initial three months of operation. The inspection frequency may be reduced after this initial period of operation if the inspection results indicate that a reduced frequency will not adversely affect the system operation.

System maintenance will be performed on a routine basis. Maintenance items include, but are not limited to, compressor oil and filter changes, desiccant and refrigerant dryer maintenance and pump cleaning. The pump level in the recovery wells will be adjusted to account for large fluctuations in the water level in the well.

Water level measurements will be made with an oil interface probe on a monthly basis. The measurements will be used to verify the extent of free-phase oil. This information will also help determine if additional recovery wells need to be added to the system and will also help to monitor the performance of the system.

5.3 PHASE III SYSTEM INSTALLATIONS/OPERATION

In Phase III, the available data will be reviewed to determine the need to add additional wells to the oil recovery system. A Technical Memorandum will be prepared to discuss the potential need for additional wells and if additional wells are needed, the approximate number and location of the wells will be included in the Technical Memorandum. The Technical Memorandum will also address the need, if any, for additional subsurface investigation points (such as CPT/ROST) to optimize the location of additional recovery or monitoring wells.

If no additional recovery wells are needed, then the existing system operation will continue until the recoverable oil is collected. If additional wells are needed, they will be installed, tested, and connected to the existing system, as appropriate.

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TABLES

Table 1. Fluid Level Measurements, Sylvan Slough Removal Action Site

Well No.	Northing	Easting	Measure Pt. (ft msl)	Ground Elevation (ft msl)	Depth to Water (ft) (11/93)	Depth to Product (ft) (11/93)	Product Thickness (11/93)	Corrected Water Elevation (11/93)	Depth to Water (ft) (12/93)	Depth to Product (ft) (12/93)	Product Thickness (12/93)	Corrected Water Elevation (12/93)	Depth to Water (ft) (7/94)	Depth to Product (ft) (7/94)	Product Thickness (7/94)	Corrected Water Elevation (7/94)	Depth to Water (ft) (9/6/94)	Depth to Product (ft) (9/6/94)	Product Thickness (9/6/94)	Corrected Water Elevation (9/6/94)
GM1	20262.97	14888.49	564.86	562.80	11.66			553.20	12.27			552.59	11.74	11.69	0.05	553 16	13.96	10.86	3.10	553.58
GM2	20264.31	15135.39	564.60	562.80	12.32			552.28	12.75			551.85	11.78	11.74	0.04	552.86	14.02	13.52	0.50	551.01
GM3	20263.26	15330.37	565.67	562.90	13.65			552.02	14.17			551.50	13.52	13.20	0 32	552.43	17.13			548.54
GM4	20239.18	15475.59	565.60	563.30	12.91	12.88	0.03	552.72	13.43			552.17	12.70			552.90	14.28			551.32
GM5	20401.31	15114 67	566 81	565 00	13.64	13.61	0.03	553.20	14.05			552.76	13.44	13.42	0.02	553.39	14 47	14.37	0 10	552.43
GM6	20453.48	15403.42	565 78	563.50	13 81			551.97	14.32			551.46	16.36	13.09	3.27	552.28	17.50	15.24	2.26	550.24
GM7	20482.56	15724.92	569 77	570 04									17.35			552.42	18.02			551.75
GM8	20122.25	15831.96	565.52	563.50									11.69			553.83	12.22			553.30
GM9	20186 37	14962.74	566 43	564 50									12.59			553 84	13.82			552.61
GM10	20180 02	15178.40	566 66	564.40									12.23			554.43	13.70			552.96
GM11	20158 28	15379.52	566.63	564.50									11.15			555.48	12 47			554.16
GM12	20088.74	15561.37	568 84	566.50									14.22			554.62	14.98			553.86
GM13	19984 01	15248.82	570.22	568 00									12.89			557.33	14.36			555.86
GM14	19962 11	15409.59	569.72	567.40									11.50			558.22	11.57			558.15
GM15	19829.32	15786.37	569 80	567.80									9.70			560 10	9.97			559.83
GM16	19658 62	15395 69	574.77	572.70									6 95			567.82	7.53			567.24
GM17	19631 96	15585.45	575 44	573.20									12 32			563.12	10.53			564.91
GM18	19941 69	14668 42	573.03	570.60									14.00			559.03	14.46			558.57
GM19S	20427.64	16122 41	572 06	572.36									20.75			551.31	23.11	22.61	0 50	549.38
GM19D	20428.89	16109.66	571.85	572.24																
GM20S	20593.33	15063 53	567.81	568.12																
GM20D	20590.82	15070 00	567 86	568.11																
GM-21	20626.46	14530.63	571.37	568.00																
GM22S	20564 21	14968.79	570.77	568.10																
GM22D	20561.56	14977.25	571.09	568.20																
GM23S	20522.89	15305.88	567.62	568.01																
GM23D	20522.56	15300 81	567.61	568.02																
GM24S	20526.45	15341.94	567 81	567.19																
GM24D	20526 90	15349.26	567.94	568.21																
GM25S	20517.01	15568.85	568.47	568.75																
GM25D	20516.46	15573.64	568.59	568.80																
GM26S	20408.12	16265.25	572.35	572.69																
GM26D	20407.40	16271.65	572 40	572.74																
GM27S	20529.54	15255.49	567 70	568.02																
GM27D	20529.56	15259.24	567.65	568.03																
GM28S	20515 46	15239 73	567.55	567.88																
GM28D	20516 05	15244.40	567 60	567.89																

ft msl = feet mean sea level

Table 1. Fluid Level Measurements, Sylvan Slough Removal Action Site

Well No.	Northing	Easting	Measure Pt. (ft msl)	Ground Elevation (ft msl)	Depth to Water (ft) (9/21/94)	Depth to Product (ft) (9/21/94)	Product Thickness (9/21/94)	Corrected Water Elevation (9/21/94)	Depth to Water (ft) (10/6/94)	Depth to Product (ft) (10/6/94)	Product Thickness (10/6/94	Corrected Water Elevation (10/6/94)	Depth to Water (ft) (8/23/95)	Depth to Product (ft) (8/23/95)	Product Thickness (8/23/95)	Corrected Water Elevation (8/23/95)	Depth to Water (ft) (8/24/95)	Depth to Product (ft) (8/24/95)	Product Thickness (8/24/95)	Corrected Water Elevation (8/24/95)
GM1	20262.97	14888.49	564.86	562.80	13.69	12.94	0.75	551.83	12.75	12.41	0.34	552.41					11.51	11.09	0.42	553.72
GM2	20264 31	15135 39	564.60	562.80	13.69	13.49	0.20	551.09	12.55			552.05					11 34			553.26
GM3	20263.26	15330.37	565.67	562.90	16.58	14.58	2.00	550.84	13.83	13.81	0.01	551.86					12 90			552.77
GM4	20239.18	15475.59	565.60	563.30	14.37	14.36	0.01	551.24	13.41	13.41	0.01	552.19					12.38			553.22
GM5	20401.31	15114 67	566 81	565 00	14.55	14.52	0.03	552.29	14.36	14.34	0.02	552.47					13.10			553.71
GM6	20453.48	15403 42	565.78	563.50	16.96	14 64	2.32	550.85	14 08	14.02	0.06	551.75					13.49	12.81	0.68	552.89
GM7	20482.56	15724.92	569.77	570 04	18.18	18.18	0 00	551.59	17.77			552.00	17.17			552.60	17.14			552.63
GM8	20122.25	15831.96	565.52	563.50	12.55			552.97	12.47	12.47	0.01	553.05					11.47			554.05
GM9	20186.37	14962.74	566.43	564.50	14.07	14.06	0.00	552.37	13.56	13.56	0 01	552.87					12.21	12.07	0.14	554.34
GM10	20180 02	15178.40	566.66	564.40	13 57	13.52	0.05	553.13	13.29	13.24	0.05	553.41					12.25	11.76	0.49	554 84
GM11	20158 28	15379.52	566.63	564.50	12.77	12.76	0.01	553.87	12.50	12.49	0.00	554.14					10.38			556 25
GM12	20088 74	15561.37	568.84	566.50	15.44			553.40	15.38	15.37	0.01	553.47					13.88			554.96
GM13	19984.01	15248.82	570 22	568.00	14 83	14 82	0 01	555.40	14.58	14.57	0.01	555.65					12.34			557.88
GM14	19962.11	15409.59	569.72	567.40	11.64	11.64	0 01	558.08	11.61	11.60	0.01	558.12					11.12			558.60
GM15	19829 32	15786.37	569 80	567.80	10 10	10 09	0 01	559 71	10.15	10 14	0.00	559.66					9 71			560 09
GM16	19658.62	15395 69	574 77	572 70	7 68			567.09	7.81			566.96					7.04			567.73
GM17	19631.96	15585.45	575.44	573.20	11.15	11.14	0.01	564.30	11.45	11.44	0.01	564.00					10.37			565.07
GM18	19941.69	14668.42	573 03	570 60	14.72			558.31	14.93	14.92	0.01	558.11					13.19			559.84
GM19S	20427.64	16122.41	572 06	572.36	21.21			550.85	20.69			551 37	19.59			552.47	19.42			552.64
GM19D	20428 89	16109.66	571.85	572 24									19.50			552.35	19.27			552.58
GM20S	20593.33	15063.53	567 81	568.12									14 57			553.24	14.51			553.30
GM20D	20590 82	15070.00	567 86	568.11									20.86	14.82	6.04	552.29	20.85	14.60	6.25	552.48
GM-21	20626.46	14530 63	571.37	568.00									19.57			551 80	19.40			551.97
GM22S	20564.21	14968.79	570.77	568.10									17.37			553.40	17.37			553.40
GM22D	20561.56	14977.25	571.09	568.20									19 20	18.75	0 45	552.28	19.02	18.54	0.48	552.49
GM23S	20522.89	15305.88	567.62	568.01									14.39			553.23	14.38			553.24
GM23D	20522 56	15300.81	567.61	568 02									15.98	15.23	0.75	552.29	15.75	14.99	0.76	552.53
GM24S	20526 45	15341.94	567.81	567.19									15.34	15.23	0.11	552.57	15.33	15.16	0.17	552.63
GM24D	20526.90	15349.26	567 94	568.21									21.47	14.71	6.76	552.39	21.39	14.48	6.91	552.60
GM25S	20517.01	15568.85	568.47	568.75									15.59			552.88	15.54			552.93
GM25D	20516.46	15573.64	568 59	568 80									21.63	15.45	6.18	552.37	21.64	15.23	6.41	552.56
GM26S	20408.12	16265.25	572.35	572.69									19.55			552.80	19 50			552.85
GM26D	20407.40	16271.65	572.40	572.74									20.07			552.33	19.82			552.58
GM27S	20529.54	15255.49	567.70	568.02									14.52			553.18	14.49			553.21
GM27D	20529.56	15259.24	567.65	568.03									15.28			552.37	15.06			552.59
GM28S	20515 46	15239.73	567.55	567.88									14.23			553.32	14.22			553.33
GM28D	20516.05	15244 40	567.60	567.89									15.21			552.39	15.03			552.57

ft msl = feet mean sea level

Table 1. Fluid Level Measurements, Sylvan Slough Removal Action Site

Well No.	Northing	Easting	Measure Pt. (ft msl)	Ground Elevation (ft msl)	Depth to Water (ft) (12/95)	Depth to Product (ft) (12/95)	Product Thickness (12/95)	Corrected Water Elevation 12/95	Depth to Water (ft) (4/18/96)	Depth to Product (ft) (4/18/96	Product Thickness (4/18/96	Corrected Water Elevation 4/18/96)	Depth to Water (ft) (9/29/96)	Depth to Product (ft) (9/29/96)	Product Thickness (9/29/96)	Corrected Water Elevation (9/29/96)	Depth to Water (ft) (10/6/96)	Depth to Product (ft) (10/6/96)	Product Thickness (10/6/96)	Corrected Water Elevation (10/6/96)
GM1	20262.97	14888 49	564 86	562.80	13.86	12.54	1.32	552.16	12.57	11.71	0.86	553.04	13.24	12.62	0.62	552.16	13.52	12.84	0.68	551.94
GM2	20264 31	15135.39	564.60	562.80	13.35	13.13	0.22	551.44	11.57			553.03	14 33	13.73	0.60	550.80	14.46	13 83	0.63	550.69
GM3	20263.26	15330.37	565 67	562.90	17.45	14 07	3.38	551.18	12.66			553.01	19.55	14.76	4.79	550.31	19.62	14.85	4.77	550.22
GM4	20239 18	15475.59	565.60	563.30	14.21	13.72	0.49	551.82	12.46			553.14	14.10	14.08	0.02	551.52	14.24	14 23	0.01	551.37
GM5	20401 31	15114 67	566 81	565.00	14.08	14 04	0 04	552.77	13.81			553 00					14.23			552.58
GM6	20453.48	15403.42	565.78	563.50	17.95	14 42	3 53	550.92	12.87			552.91	17.07	15.91	1.16	549.73	17.03	15.95	1.08	549.70
GM7	20482.56	15724 92	569.77	570.04									17.88			551.89	17.95			551.82
GM8	20122.25	15831.96	565 52	563.50					12.02			553.50	11.93			553.59	12.10			553.42
GM9	20186 37	14962.74	566.43	564 50	13.90	13.68	0.22	552.72	13.28	13.26	0.02	553.17	13.66	13.44	0 22	552.96	13.84	13.65	0.19	552.76
GM10	20180.02	15178.40	566.66	564.40	13.48	13.44	0.04	553.22	12.92			553.74	13.88	13.31	0.57	553.28	13.74	13.24	0 50	553.36
GM11	20158 28	15379.52	566.63	564.50	12.41			554.22	12.27			554.36	12.36			554 27	12.58			554.05
GM12	20088 74	15561.37	568.84	566.50					14.88			553 96	14.43			554 41	14 66			554.18
GM13	19984 01	15248 82	570.22	568.00					14 43			555.79	14.29			555.93	14.54			555.68
GM14	19962.11	15409 59	569.72	567.40					11.68			558.04	11.55			558.17	11.55			558.17
GM15	19829 32	15786 37	569 80	567 80					10 19			559 61	10 02			559.78	9 99			559 81
GM16	19658 62	15395 69	574 77	572 70					6.75			568 02	7 61			567 16	7 66			567 11
GM17	19631.96	15585.45	575.44	573.20					10.56			564.88	10.85			564.59	11.08			564.36
GM18	19941.69	14668.42	573 03	570.60					15.50			557.53	14.05			558.98	14.21			558.82
GM19S	20427 64	16122 41	572 06	572.36									23.23	23.03	0.20	549.01	23.77			548.29
GM19D	20428 89	16109 66	571 85	572.24									23 84			548.01	23.47	23.00	0.47	548.79
GM20S	20593.33	15063.53	567.81	568.12	15.36			552.45	14.97			552 84	15.11			552.70	15 24			552.57
GM20D	20590.82	15070 00	567.86	568.11	20.68	18.22	2 46	549.33	13 99	13.96	0 03	553.90	20.40	20 03	0.37	547.78	20.31	20.03	0.28	547.80
GM-21	20626.46	14530 63	571.37	568.00	21.41			549.96	18.64			552 73	23 03			548.34	23.05			548.32
GM22S	20564.21	14968 79	570.77	568.10	21.19			549 58	18 60			552.17	17 82			552 95	22.95	22.95	0.00	547.82
GM22D	20561.56	14977.25	571.09	568.20	18.18			552.91	17 91			553 18	26.10	22 84	3.26	547.84	25.38	22.92	2.46	547.86
GM23S	20522.89	15305.88	567.62	568.01	15.13			552.49					15.05			552.57	15.15			552.47
GM23D	20522.56	15300.81	567.61	568.02	19.03	18.29	0.74	549.23					20.39	19.82	0.57	547.72	20.27	19 72	0.55	547.82
GM24S	20526.45	15341 94	567.81	567.19									16.93	16.34	0.59	551.40	17.12	16.44	0.68	551.29
GM24D	20526.90	15349 26	567 94	568.21									21.75	19.85	1.90	547 85	21.75	19.73	2 02	547.96
GM25S	20517 01	15568.85	568.47	568.75									16.16			552.31	16.27			552.20
GM25D	20516 46	15573.64	568.59	568 80									22.20	20.59	1.61	547.80	22.24	20 45	1.79	547.92
GM26S	20408.12	16265.25	572.35	572.69																
GM26D	20407.40	16271.65	572.40	572.74																
GM27S	20529.54	15255.49	567.70	568.02					14.90			552.80	15.04			552.66	15.13			552.57
GM27D	20529.56	15259.24	567.65	568 03					14.45			553 20	19.64	19.56	0.08	548 08	19.56	19.47	0.09	548.17
GM28S	20515.46	15239.73	567.55	567.88					14.71			552.84	15.08	14.79	0.29	552.72	15.19	14.87	0.32	552.64
GM28D	20516.05	15244.40	567.60	567.89					14 36			553 24	22.30	19.18	3.12	548.03	21.38	19.10	2.28	548.22

ft msl = feet mean sea level

Table 1. Fluid Level Measurements, Sylvan Slough Removal Action Site

Well No.	Northing	Easting	Measure Pt. (ft msl)	Ground Elevation (ft msl)	Depth to Water (ft) (10/13/96)	Depth to Product (ft) (10/13/96)	Product Thickness (10/13/96)	Corrected Water Elevation (10/13/96)	Depth to Water (ft) (10/18/96)	Depth to Product (ft) (10/18/96)	Product Thickness (10/18/96)	Corrected Water Elevation (10/18/96)	Depth to Water (ft) (11/1/96)	Depth to Product (ft) (11/1/96)	Product Thickness (11/1/96)	Corrected Water Elevation (11/1/96)	Depth to Water (ft) (1/20/97)	Depth to Product (ft) (1/20/97)	Product Thickness (1/20/97)	Corrected Water Elevation (1/20/97)
GM1	20262.97	14888 49	564.86	562.80	13.73	13.11	0.62	551.67	14.80	13.30	1.50	551.37	13 46	12 98	0.48	551.82	14.17	13.33	0.84	551.43
GM2	20264 31	15135.39	564 60	562.80	14.83	14.13	0.70	550.38	14.83	14.28	0.55	550.25	13.60	13.51	0.09	551.08	15.07	14.44	0.63	550 08
GM3	20263.26	15330.37	565.67	562.90	19.80	15.08	4.72	550.00	19.95	15.24	4.71	549.84	14 85	14.80	0.05	550.86	20.01	15.73	4.28	549.41
GM4	20239.18	15475.59	565.60	563.30	14.45	14.44	0.01	551.16	14.64	14.61	0.03	550.99	14.40	14.40	0.00	551.20	15.25	15.23	0.02	550.37
GM5	20401.31	15114 67	566.81	565.00				ABAN				ABAN				ABAN				
GM6	20453.48	15403.42	565.78	563.50				ABAN				ABAN				ABAN				
GM7	20482.56	15724.92	569.77	570.04	18.16			551.61	18.13			551.64	18.23			551.54	NF	NF		
GM8	20122.25	15831.96	565.52	563.50	12.24			553.28	12.38			553.14	12.51			553.01	13 03			552.49
GM9	20186.37	14962.74	566 43	564.50	14.14	13.92	0.22	552.48	14.37	14.12	0.25	552.28	14.08	13.99	0.09	552.43	14.37	14.11	0.26	552.29
GM10	20180.02	15178 40	566.66	564.40	14.12	13.58	0.54	553.01	14.57	13.94	0.63	552.64	13.51	13.14	0.37	553.47	14.55	13.94	0.61	552.64
GM11	20158.28	15379 52	566.63	564.50	12.93	12.93	0.00	553.70	13.20			553.43	12.39			554.24	13.51			553.12
GM12	20088.74	15561.37	568.84	566.50	14 90			553.94	15.06			553.78	15.08			553.76	15.66			553.18
GM13	19984 01	15248.82	570.22	568.00	14.89			555.33	15.19			555.03	14.69	14.69	0.00	555.53	15.70			554.52
GM14	19962.11	15409.59	569.72	567.40	11.57			558.15	11.65			558.07	11.50			558.22	11.92			557.80
GM15	19829 32	15786.37	569 80	567.80	10.15			559.65	10.08			559.72	9.55			560.25	10.60			559.20
GM16	19658 62	15395 69	574.77	572.70	7.81			566 96	7.93			566 84	8.10			566.67	8.29			566.48
GM17	19631.96	15585.45	575.44	573.20	11.26			564.18	11.40			564.04	11.36			564 08	11.60			563.84
GM18	19941.69	14668 42	573.03	570 60	14 41			558.62	14.58			558.45	14.75			558.28	15.85			557.18
GM19S	20427 64	16122.41	572 06	572 36	23.95			548.11	23 16	22.97	0.19	549 07	21.36	21.32	0.04	550.74				
GM19D	20428.89	16109 66	571 85	572 24	23.66	23.18	0.48	548.61	24.18			547.67	21.58			550.27				
GM20S	*20593 33*	*15063.53*	*567 81*	568.12	15.41			552.40	15.46			552.35	16.65			551.16	15.97			551 84
GM20D	20590.82	15070 00	567.86	568.11	20 48	20.20	0.28	547.63	20.03	20.02	0.01	547.84	20.46	17.20	3.26	550.25	20.48	16.76	3.72	550.64
GM-21	20626.46	14530 63	571.37	568.00	23.22			548.15	23.09			548.28	21.17			550.20	20.58			550.79
GM22S	20564 21	14968.79	570.77	568.10	18 09	18.09	0.00	552.68	18.19			552.58	18.42			552.35	18.85			551.92
GM22D	20561.56	14977.25	571 09	568.20	25.15	23 01	2.14	547.81	24.76	22.90	1.86	547.96	22.45	20.62	1.83	550.24	22.92	20.11	2.81	550.63
GM23S	20522.89	15305.88	567.62	568.01	15.40			552.22	15.40			552.22	15.59			552.03				
GM23D	20522.56	15300.81	567.61	568.02	20.44	19.92	0.52	547.63	20.14	19.59	0.55	547.95	17.85	17.32	0.53	550.22				
GM24S	20526.45	15341.94	567.81	567.19	17.30	16.62	0.68	551.11	17.48	16.64	0.84	551.07	17.40	16.58	0.82	551.13	17.86	17.18		549.95
GM24D	20526.90	15349.26	567 94	568.21	21.96	19.94	2.02	547.75	21.89	19.62	2 27	548 04	21.57	17.11	4 46	550.27	20.17	18.05	2 12	549.63
GM25S	20517.01	15568 85	568.47	568.75	16 47			552.00	16.44			552.03	16.60			551.87	16.80			551.67
GM25D	20516.46	15573.64	568.59	568.80	22.43	20.66	1.77	547.71	21.44	20.50	0.94	547.97	21.45	19 85	1.60	548.54	20.98	18 60	2.38	549.69
GM26S	20408 12	16265.25	572.35	572.69				572.35	20.54			551.81	20.36			551.99				
GM26D	20407.40	16271.65	572.40	572.74				572.40	24.29			548.11	22.16			550.24				
GM27S	20529.54	15255.49	567.70	568.02	15 33			552.37	15.39			552.31	15.57			552.13	15.85			551.85
GM27D	20529.56	15259 24	567.65	568 03	19.75	19.66	0.09	547.98	19.53	19.45	0.08	548.19	17.35	17.29	0.06	550.35	17.26	17.18	0.08	550.46
GM28S	20515.46	15239.73	567.55	567.88	15.32	15 00	0.32	552.51	15.45	15.14	0.31	552.37	15.64	15.33	0.31	552.18	15.74	15.54	0.20	551.99
GM28D	20516 05	15244.40	567.60	567.89	21.56	19.30	2.26	548.02	19.77	19.39	0.38	548.16	17.63	17.22	0.41	550.33	17.57	17.08	0.49	550.46

ft msl = feet mean sea level

Table 1. Fluid Level Measurements, Sylvan Slough Removal Action Site

Well No.	Northing	Easting	Measure Pt. (ft msl)	Ground Elevation (ft msl)	Depth to Water (ft) (11/93)	Depth to Product (ft) (11/93)	Product Thickness (11/93)	Corrected Water Elevation (11/93)	Depth to Water (ft) (12/93)	Depth to Product (ft) (12/93)	Product Thickness (12/93)	Corrected Water Elevation (12/93)	Depth to Water (ft) (7/94)	Depth to Product (ft) (7/94)	Product Thickness (7/94)	Corrected Water Elevation (7/94)	Depth to Water (ft) (9/6/94)	Depth to Product (ft) (9/6/94)	Product Thickness (9/6/94)	Corrected Water Elevation (9/6/94)
GM29S	20547.76	15285.49	567.78	568.14																
GM29D	20550.60	15283.50	567.83	568.13																
GM30	20568.19	15047.78	567.50	568.11																
GM31	20597.44	15044.07	567.91	568.15																
GM32	20616.93	15062.10	567.59	567.81																
RW1	20534.30	15258.77	568.86	568.05																
RW2	20545.31	15282.33	569.71	568.14																
RW3	20524.41	15257.93	568.42	566.00																
RW-4	20585.75	15041.40	570.95	568.40																
RW5	20584.98	15050.07	570.93	568.50																
RW6	20584.64	15060.15	570.92	568.40																
RW7	20582.95	15070.57	570.98	568.40																
A1	20452.32	14930.45	569.37	567.40																
A2	20350.78	15163.47	566.40	564.60																
A3	20314.31	15353.85	563.71	561.90																
B1	20420.05	15004.01	568.92	567.00																
B2	20464.78	15178.21	566.90	567.40																
C1	20492.26	15321.22	567.54	568.05																
C2	20537.70	15418.50	567.71	568.08																
C3	20472.38	15408.10	566.44	564.70																
D1	20565.42	15160.76	570.15	568.35																
E1	20597.75	14775.30	569.97	568.00																
F1	20407.46	14936.68	568.64	566.70																
F2	20512.97	15004.14	569.43	567.50																
F3	20476.15	15115.94	569.27	567.30																
G1	20666.66	14693.66	570.10	568.19																
G2	20571.19	14757.11	570.20	568.30																
G3	20503.32	14825.91	570.21	568.30																
I1	20563.88	15375.60	569.79	567.83																
I2	20551.33	15482.03	569.67	567.86																
J1	20470.94	15352.29	566.55	564.60																
J2	20450.46	15376.34	565.31	563.30																
MW-5			570.67	569.00	18.43			552.24	18.80			551.87	18.32			552.35	19.76			550.91
MW6			570.13	568.00	16.96	16.93	0.03	553.20	17.78			552.35	17.01	16.99	0.02	553.14	18.15			551.98
MW-7																				
MW-8			566.28	565.80	13.88			552.40	14.44			551.84	13.93			552.35	15.09			551.19
MW-9			570.12	568.00	22.65	19.55	3.10	550.18	22.48	19.38	3.10	550.35	21.00	18.64	2.36	551.16	24.65	20.82	3.83	548.79
STAFF	20581.73	15236.84	554.21	550.80																

ft msl = feet mean sea level

Table 1. Fluid Level Measurements, Sylvan Slough Removal Action Site

Well No.	Northing	Easting	Measure Pt. (ft msl)	Ground Elevation (ft msl)	Depth to Water (ft) (9/21/94)	Depth to Product (ft) (9/21/94)	Product Thickness (9/21/94)	Corrected Water Elevation (9/21/94)	Depth to Water (ft) (10/6/94)	Depth to Product (ft) (10/6/94)	Product Thickness (10/6/94	Corrected Water Elevation (10/6/94)	Depth to Water (ft) (8/23/95)	Depth to Product (ft) (8/23/95)	Product Thickness (8/23/95)	Corrected Water Elevation (8/23/95)	Depth to Water (ft) (8/24/95)	Depth to Product (ft) (8/24/95)	Product Thickness (8/24/95)	Corrected Water Elevation (8/24/95)
GM29S	20547.76	15285.49	567 78	568.14									15.50			552.28	14.68			553.10
GM29D	20550.60	15283.50	567.83	568.13													15.28			552.55
GM30	20568.19	15047.78	567.50	568.11																
GM31	20597.44	15044.07	567.91	568.15																
GM32	20616.93	15062.10	567.59	567.81																
RW1	20534.30	15258.77	568 86	568 05									15.69			553.17	15.68			553.18
RW2	20545.31	15282.33	569.71	568.14									16 55			553.16	16.54			553.17
RW3	20524.41	15257.93	568 42	566.00									16.05			552.37	15.85			552.57
RW-4	20585.75	15041.40	570 95	568.40																
RW5	20584 98	15050.07	570.93	568.50																
RW6	20584 64	15060.15	570.92	568.40																
RW7	20582.95	15070 57	570.98	568.40																
A1	20452.32	14930.45	569.37	567.40																
A2	20350.78	15163 47	566 40	564.60																
A3	20314.31	15353.85	563 71	561.90																
B1	20420 05	15004.01	568.92	567.00																
B2	20464 78	15178.21	566.90	567.40																
C1	20492.26	15321.22	567.54	568 05																
C2	20537.70	15418.50	567.71	568 08																
C3	20472 38	15408.10	566.44	564.70																
D1	20565.42	15160.76	570.15	568 35																
E1	20597.75	14775.30	569.97	568.00																
F1	20407.46	14936 68	568 64	566.70																
F2	20512 97	15004 14	569.43	567.50																
F3	20476.15	15115.94	569.27	567.30																
G1	20666.66	14693.66	570.10	568.19																
G2	20571.19	14757.11	570.20	568.30																
G3	20503.32	14825.91	570 21	568.30																
I1	20563.88	15375.60	569.79	567.83																
I2	20551.33	15482 03	569.67	567.86																
J1	20470 94	15352.29	566.55	564.60																
J2	20450 46	15376.34	565.31	563.30																
MW-5			570.67	569.00	19 19			551.48	18.73			551.94								
MW6			570.13	568.00	18.11	18 10	0 00	552.03	17.93	17.92	0 01	552.21	16.71			553.42	16.67			553 46
MW-7																				
MW-8			566.28	565.80	15.34			550 94	14.73			551.55					13.90			552.38
MW-9			570.12	568.00	25.24	18.74	6.50	550.57	21.80	18.94	2.86	550.82								
STAFF	20581.73	15236 84	554 21	550.80									1.51			552.70	1 69			552.52

ft msl = feet mean sea level

Table 1. Fluid Level Measurements, Sylvan Slough Removal Action Site

Well No.	Northing	Easting	Measure Pt. (ft msl)	Ground Elevation (ft msl)	Depth to Water (ft) (12/95)	Depth to Product (ft) (12/95)	Product Thickness (12/95)	Corrected Water Elevation 12/95	Depth to Water (ft) (4/18/96)	Depth to Product (ft) (4/18/96	Product Thickness (4/18/96	Corrected Water Elevation 4/18/96)	Depth to Water (ft) (9/29/96)	Depth to Product (ft) (9/29/96)	Product Thickness (9/29/96)	Corrected Water Elevation (9/29/96)	Depth to Water (ft) (10/6/96)	Depth to Product (ft) (10/6/96)	Product Thickness (10/6/96)	Corrected Water Elevation (10/6/96)
GM29S	20547 76	15285.49	567.78	568.14									15.75	15.05	0.70	552.64	16.06	15.17	0.89	552.50
GM29D	20550 60	15283.50	567.83	568.13									15.10	15.02	0.08	552.80	20.00	19.92	0.08	547.90
GM30	20568.19	15047.78	567.50	568.11									19.69	19.68	0.01	547.82	20.07			547.43
GM31	20597.44	15044.07	567.91	568.15													19.66	19.64	0.02	548.27
GM32	20616.93	15062.10	567.59	567.81									20.41	19.78	0.63	547.73	19.87	19.76	0.11	547.82
RW1	20534.30	15258.77	568.86	568.05									16.26	16.19	0.07	552.66	16.38	16.29	0.09	552.56
RW2	20545.31	15282.33	569.71	568.14	17.16			552.55					17.09			552.62	17.07			552.64
RW3	20524.41	15257.93	568.42	566.00									20.65			547.77	20.58			547.84
RW-4	20585.75	15041.40	570 95	568.40													23.12	23.10	0.02	547.85
RW5	20584.98	15050.07	570 93	568.50													24.11	22.95	1.16	547.84
RW6	20584 64	15060 15	570 92	568.40													23 47	23.04	0.43	547.83
RW7	20582 95	15070.57	570.98	568.40													23.86	23.16	0.70	547.73
A1	20452.32	14930.45	569.37	567.40													16.54			552.83
A2	20350.78	15163.47	566 40	564 60													13.54			552.86
A3	20314.31	15353 85	563.71	561.90													11.02			552.69
B1	20420.05	15004 01	568.92	567.00													17 10			551.82
B2	20464.78	15178 21	566.90	567 40													14.30			552.60
C1	20492.26	15321.22	567 54	568.05													15.08			552.46
C2	20537.70	15418.50	567.71	568.08													17.05	16 42	0 63	551.21
C3	20472 38	15408 10	566.44	564.70													16.23			550.21
D1	20565.42	15160.76	570.15	568.35													18.01			552.14
E1	20597.75	14775.30	569.97	568.00													18.24			551.73
F1	20407.46	14936.68	568.64	566.70													22.08			546.56
F2	20512 97	15004.14	569 43	567.50																
F3	20476 15	15115 94	569.27	567.30													23.06			546.21
G1	20666.66	14693.66	570.10	568.19																
G2	20571.19	14757.11	570 20	568.30													20.52			549.68
G3	20503.32	14825.91	570 21	568.30													20 60	20.56	0.04	549.65
I1	20563 88	15375.60	569.79	567.83																
I2	20551 33	15482.03	569.67	567.86																
J1	20470 94	15352.29	566.55	564.60													18.03	18.02	0 01	548.53
J2	20450 46	15376.34	565.31	563.30													28.63	19.33	9.30	544.82
MW-5			570.67	569.00					17.39			553.28	19.53			551.14	19.55			551.12
MW6			570.13	568.00	18.25			551.88	17.13			553.00	17.98	17.95	0.03	552.18	18.15	18.10	0.05	552.02
MW-7																				
MW-8			566.28	565.80					13.88			552.40	15.06			551.22	15.22			551.06
MW-9			570.12	568.00					20.20	17.56	2.64	552.23	22.02	20.53	1.49	549.40	22.20	20 52	1.68	549.39
STAFF	20581.73	15236 84	554.21	550 80																

ft msl = feet mean sea level

Table 1. Fluid Level Measurements, Sylvan Slough Removal Action Site

Well No.	Northing	Easting	Measure Pt. (ft msl)	Ground Elevation (ft msl)	Depth to Water (ft) (10/13/96)	Depth to Product (ft) (10/13/96)	Product Thickness (10/13/96)	Corrected Water Elevation (10/13/96)	Depth to Water (ft) (10/18/96)	Depth to Product (ft) (10/18/96)	Product Thickness (10/18/96)	Corrected Water Elevation (10/18/96)	Depth to Water (ft) (11/1/96)	Depth to Product (ft) (11/1/96)	Product Thickness (11/1/96)	Corrected Water Elevation (11/1/96)	Depth to Water (ft) (1/20/97)	Depth to Product (ft) (1/20/97)	Product Thickness (1/20/97)	Corrected Water Elevation (1/20/97)
GM29S	20547.76	15285.49	567.78	568.14	16.46	15.32	1.14	552.32	16.45	15.38	1.07	552.27	16.58	15.58	1.00	552.08	16.67	15.75	0.92	551.92
GM29D	20550 60	15283.50	567.83	568.13	20.19	20.10	0.09	547.72	19.91	19.81	0.10	548.01	17.62	17.55	0.07	550.27	17.61	17.53	0.08	550.29
GM30	20568.19	15047.78	567.50	568.11	20.56			546.94	19.55	19.53	0.02	547.97	17.25	17.24	0.01	550.26	16.86	16.84	0.02	550.66
GM31	20597.44	15044.07	567.91	568.15	19.96	19.94	0.02	547.97	19.96			547.95	17.68			550.23	17.23			550.68
GM32	20616.93	15062.10	567.59	567.81	20.23	20.00	0.23	547.56	20.17	19.56	0.61	547.95	17.85	17.25	0.60	550.27	17.60	16.90	0.70	550.60
RW1	20534.30	15258.77	568.86	568.05	16.53	16.44	0.09	552.41	16.64	16.55	0.09	552.30	16.80	16.73	0.07	552.12	17.04	16.93	0.11	551.92
RW2	20545.31	15282.33	569 71	568.14	17.31			552.40	17.43			552.28	17.61			552.10	18.85			550.86
RW3	20524 41	15257.93	568.42	566.00	20.74			547.68	20.43			547.99	18.16			550.26	17.85			550.57
RW-4	20585 75	15041.40	570.95	568.40	23.16	23.15	0.01	547.80	23.05			547.90	20.75			550.20	20.57			550.38
RW5	20584 98	15050.07	570.93	568.50	23.93	23.03	0.90	547.79	22.99	22.95	0.04	547.98	20.81	20.65	0.16	550.26	23.99	20.07	3.92	550.37
RW6	20584 64	15060.15	570 92	568.40	23.67	23.06	0.61	547.78	22.95	22.95	0.00	547.97	20.74	20.73	0.01	550.19	22.98	20.15	2.83	550.42
RW7	20582.95	15070.57	570.98	568.40	23.98	23.08	0.90	547.79	23.14			547.84	20.72	20.71		550.26	22.45	20.27	2.18	550.44
A1	20452.32	14930 45	569.37	567.40	16.68			552.69	16.80			552.57	17.09			552.28	17.39			551.98
A2	20350 78	15163.47	566.40	564.60	13.73			552.67	13.88			552.52	14.22			552.18	14.33			552.07
A3	20314 31	15353.85	563.71	561 90	11.21			552.50	11.27			552 44	11.55			552.16	11.67			552.04
B1	20420 05	15004.01	568.92	567.00	16.41			552.51	16.54			552.38	16.75			552.17	16.94			551.98
B2	20464 78	15178 21	566.90	567.40	14.49			552.41	14 62			552.28	14.56			552.34	14.28			552.62
C1	20492 26	15321.22	567 54	568.05	16.20			551.34	15.31			552.23	15.54			552.00	14 76			552.78
C2	20537 70	15418 50	567.71	568.08	17.28	16 64	0 64	550 99	17.10	16 63	0 47	551 02	17.11	16.51	0 60	551.13	16 60	16.27	0 33	551.40
C3	20472.38	15408.10	566 44	564.70	16.43	16.43	0 00	550.01	16.53			549.91	15.54			550.90	15.19			551.25
D1	20565 42	15160 76	570.15	568.35	17.63	17.63	0.00	552.52	17.75	17.73	0.02	552.42	18.02	17.93	0 09	552.21	18.71	18.18	0.53	551.90
E1	20597.75	14775.30	569.97	568.00	18.28	18.28	0.00	551.69	18.38	18.38	0.00	551.59	18.40	18.40	0.00	551.57	18.57	18.36	0.21	551.58
F1	20407.46	14936.68	568 64	566.70	20 18			548.46	20.53			548.11	18.92			549.72	18 09			550 55
F2	20512 97	15004 14	569 43	567 50	21 61			547.82	21.42			548.01	19.21			550.22	19.00			550.43
F3	20476.15	15115.94	569.27	567.30	22.46			546.81	21.24			548.03					18.88			550.39
G1	20666.66	14693.66	570.10	568.19	22.46			547 64	22.16	22.16	0.00	547.94	19.84	19.84	0 00	550.26	19.51			550.59
G2	20571.19	14757.11	570.20	568.30	22 20			548.00	22.14			548.06	19.83			550.37	19.53			550 67
G3	20503 32	14825.91	570 21	568.30	22.19	22.18	0.01	548.03	22.06			548.15	19.94	19.86	0.08	550.34	20.36	19.38	0.98	550.71
I1	20563.88	15375.60	569.79	567.83	22.05	22.05	0.00	547.74	23.43	21.55	1.88	548.01					20.82	18.92	1.90	550.63
I2	20551.33	15482.03	569.67	567.86	22.00	22.00	0.00	547.67	21.91			547.76	19.80			549.87	19.23			550.44
J1	20470 94	15352 29	566.55	564.60	17.94			548.61	18.53			548.02	16.40			550.15	16.19			550.36
J2	20450.46	15376.34	565.31	563.30	24.75	16.27	8.48	547.98	22.57	16.47	6.10	548.08	19.09	14.58	4.51	550.17	21.52	14.17	7.35	550.22
MW-5			570.67	569.00	19.74			550.93	19.81			550.86	19.12			551.55	18.90			551.77
MW6			570.13	568.00				ABAN				ABAN				ABAN				ABAN
MW-7													16.31							ABAN
MW-8			566.28	565.80	15.37			550.91	15.49			550.79	15.54			550.74	14.81			551.47
MW-9			570.12	568.00				ABAN				ABAN				ABAN				
STAFF	20581.73	15236.84	554.21	550 80																554.21

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ft msl = feet mean sea level

Table 2. Confining Clay Data and Maximum TPH Data, Sylvan Slough Removal Action Site

	CPT No. Well No.	ELEVATION (GROUND SURFACE)	Depth to Bottom of Clay (4)	Depth to Top of Clay (4)	Elevation Bottom of Clay (4)	Elevation Top of Clay (4)	Maximum TPH Concentration mg/kg) Above Confining Clay	Maximum TPH Concentration mg/kg) Below Confining Clay
	CPT 1	568.49	18.3	16.6	550.2	551.9	4,300	5,000
	CPT 2	567.86	22.3	16.5	545.6	551.4	500	10,500
	CPT 3	567.86	25.1	19.5	542.8	548.4	7,400	5,300
	CPT 4	567.83	22	19	545.8	548.8	12,700	2,200
	CPT 5	569.88	24.9	20	545.0	549.9	600	200
	CPT 6	568.13	22.3	19	545.8	549.1	3,800	14,300
	CPT 7B	568.33	19.5	16.7	548.8	551.6	600	18,000
	CPT 8	567.41	21.8	18.2	545.6	549.2	100	5,400
	CPT 9	564.22	16.7	14.2	547.5	550.0	13,300	2,900
	CPT 10	563.67	13.9	12.7	549.8	551.0	9,700	14,800
	CPT 11	562.49	15.7	12.1	546.8	550.4	200	2,900
	CPT 12A	566.46	19.6	16.7	546.9	549.8	100	1,700
	CPT 13C	566.80	18.4	16.4	548.4	550.4	10,400	6,700
	CPT 14	566.34					8,900	
	CPT 15	564.32	17.6	16.2	546.7	548.1	8,700	3,800
	CPT 16	562.99	14.9	14.1	548.1	548.9	1,900	2,700
	CPT 17	562.80	15.6	14.7	547.2	548.1	100	2,500
	CPT 18	562.41	13	12	549.4	550.4	100	2,900
	CPT 19	562.86	14	9.4	548.9	553.5	10,400	8,900
	CPT 20A	562.88	17.4	13.3	545.5	549.6	14,000	1,200
	CPT 21	565.03					11,400	
	CPT 22	565.03					14,000	
(2)	CPT 23	565.39	16.5	12.5	548.9	552.9	15,500	5,400
	CPT 24	563.93					12,400	
(2)	CPT 25	564.12	11.6	10.7	552.5	553.4	7,600	2,400
	CPT 26	564.55	No Sounding Performed					
	CPT 27	565.44	No Sounding Performed					
	CPT 28	567.74	21.6	18	546.1	549.7	2,700	7,500
	CPT 29	567.95	18.1	17.1	549.9	550.9	7,300	9,100
	CPT 30	568.24	22.3	17.8	545.9	550.4	12,500	7,000
	CPT 31	567.45	19	17.4	548.5	550.1	10,100	8,500
	GM 1	562.80						
	GM 2	562.80						
	GM-3	562.90						
	GM 4	563.30						
	GM 5	565.00						
	GM 6	563.50						

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Table 2. Confining Clay Data and Maximum TPH Data, Sylvan Slough Removal Action Site

	CPT No. Well No.	ELEVATION (GROUND SURFACE)	Depth to Bottom of Clay (4)	Depth to Top of Clay (4)	Elevation Bottom of Clay (4)	Elevation Top of Clay (4)	Maximum TPH Concentration mg/kg) Above Confining Clay	Maximum TPH Concentration mg/kg) Below Confining Clay
(1)	GM 7	570.04	24	19.5	546.0	550.5		
	GM 8	563.50	15	14.8	548.5	548.7		
	GM 9	564.50						
	GM 10	564.40						
	GM 11	564.50	15	12	549.5	552.5		
	GM 12	566.50						
(2)	GM 13	568.00	10	6.5	558.0	561.5		
(2)	GM 14	567.40	11	4	556.4	563.4		
(2)	GM 15	567.80	10.5	6	557.3	561.8		
(2)	GM 16	572.70	12	1	560.7	571.7		
(2)	GM 17	573.20	11.5	3.5	561.7	569.7		
(2)	GM 18	570.60	10	4.5	560.6	566.1		
	GM 19D	572.24	26	22	546.2	550.2		
	GM 20S	568.12	19	17	549.1	551.1		
(3)	GM 21	568.00						
(3)	GM 22S	568.10						
	GM 23S	568.01	23	20.5	545.0	547.5		
	GM 24S	567.19	20.5	18	546.7	549.2		
	GM 25D	568.75	20	18.5	548.8	550.3		
	GM 26S	572.69	27	26	545.7	546.7		
	GM 27S	568.02	22	19	546.0	549.0		
	GM 28S	567.88	20	17.5	547.9	550.4		
	GM 29S	568.14	25	20	543.1	548.1		
	RW 1	568.05	22	19	546.1	549.1		
	RW 2	568.14	22	20	546.1	548.1		
	RW 3	566.00	21.5	18.5	544.5	547.5		
	GM-A1	567.40		17.8		549.6		
	GM-A2	564.60		16		548.6		
	GM-A3	561.90		13.5		548.4		
	GM-B1	567.00		18.8		548.2		
*	GM-B2	567.40		18.5		548.9		
*	GM-C1	568.05		20.9		547.2		
*	GM-C2	568.08		17.5		550.6		
	GM-C3	564.70		16.5		548.2		
*	GM-D1	568.35		17.5		550.9		
	GM-E1	568		18.33		549.7		
	GM-F1	566.7	21.5	18.5	545.2	548.2		
	GM-F2	567.5	21	18.5	546.5	549.0		

Table 2. Confining Clay Data and Maximum TPH Data, Sylvan Slough Removal Action Site

	CPT No. Well No.	ELEVATION (GROUND SURFACE)	Depth to Bottom of Clay (4)	Depth to Top of Clay (4)	Elevation Bottom of Clay (4)	Elevation Top of Clay (4)	Maximum TPH Concentration mg/kg) Above Confining Clay	Maximum TPH Concentration mg/kg) Below Confining Clay
	GM-F3	567.3	19.4	17.7	547.9	549.6		
	GM-G1	568.19	23.5	18.7	544.7	549.5		
	GM-G2	568.3	19.5	18	548.8	550.3		
	GM-G3	568.3	19.8	17.8	548.5	550.5		
*	GM-I1	567.83	21.5	18.5	546.3	549.3		
*	GM-I2	567.86	20.7	19.2	547.2	548.7		
	GM-J1	564.6	18	15.5	546.6	549.1		
	GM-J2	563.3	15.5	14	547.8	549.3		
*	GM-30	568.11		16.8	568.1	551.3		
*	GM-31	568.15		17.1	568.2	551.1		
*	GM-32	567.81		16.8	567.8	551.0		
	PZ-33	568.4		17.2	568.4	551.2		
	RW-5	568.5		16.8	568.5	551.7		
	RW-6	568.4		17.5	568.4	550.9		
	RW-7	568.4		16.5	568.4	551.9		

(1) Minimum depth of clay
(2) clay not related to confining clay
(3) No sample recovery from "clay zone"
(4) Blanks indicate no clay found or boring designed to terminate at the top of the confining clay
* Elevation of concrete, not ground surface

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FIGURES

NOTES:

1. PROPERTY BOUNDARIES DEPICTED ARE APPROXIMATE
2. BURLINGTON NORTHERN OWNS A STRIP OF LAND FIVE FEET WIDE NORTH OF THE NAVISTAR PROPERTY ADJACENT TO THE SLOUGH (NOT SHOWN).

SOURCE: U.S.G.S. QUADRANGLE, DAVENPORT EAST, IOWA-ILLINOIS DATED 1991

GERAGHTY & MILLER, INC.
Environmental Services

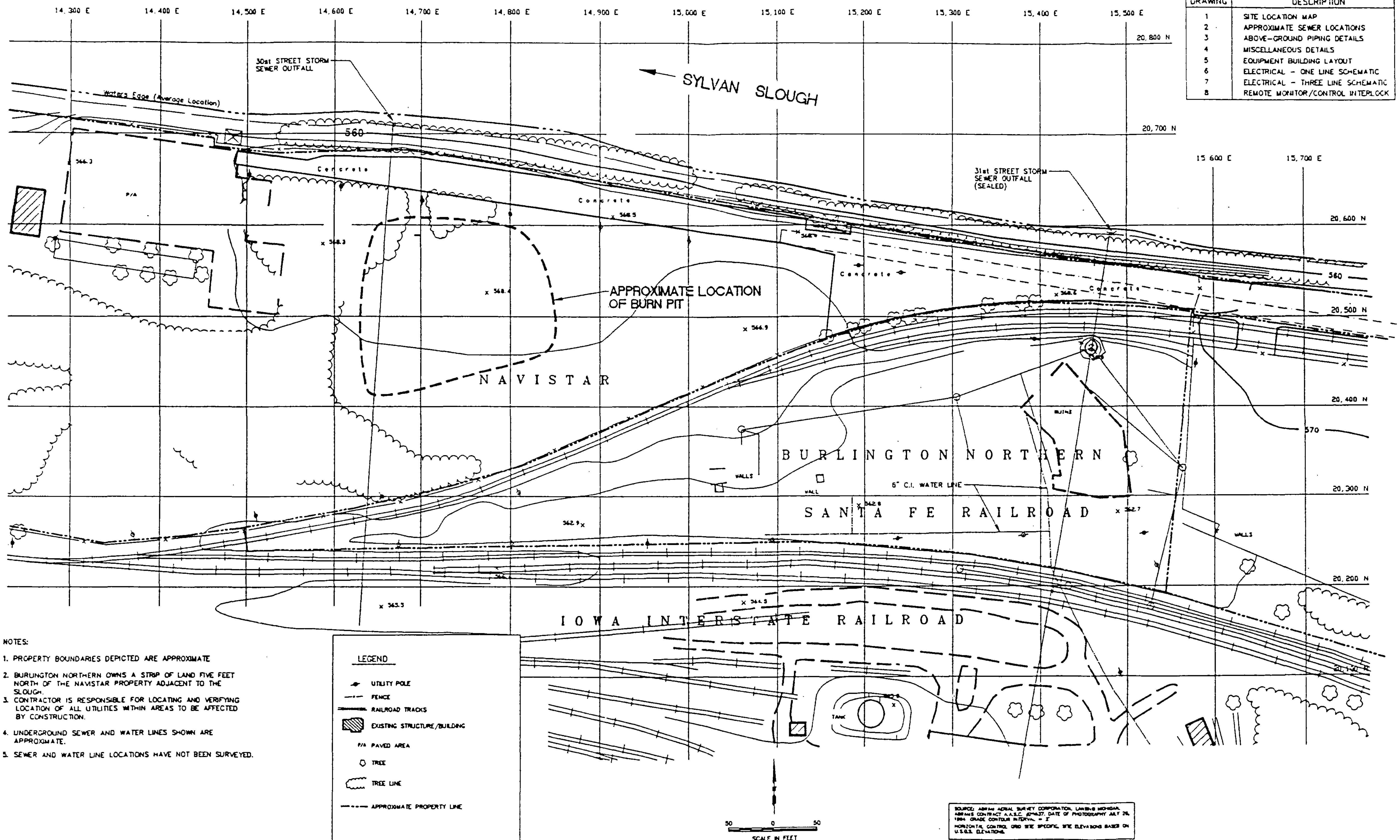
SITE LOCATION MAP

CONCEPTUAL DESIGN

SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

FIGURE

1



DRAWING INDEX

DRAWING	DESCRIPTION
1	SITE LOCATION MAP
2	APPROXIMATE SEWER LOCATIONS
3	ABOVE-GROUND PIPING DETAILS
4	MISCELLANEOUS DETAILS
5	EQUIPMENT BUILDING LAYOUT
6	ELECTRICAL – ONE LINE SCHEMATIC
7	ELECTRICAL – THREE LINE SCHEMATIC
8	REMOTE MONITOR/CONTROL INTERLOCK

NOTES:

1. PROPERTY BOUNDARIES DEPICTED ARE APPROXIMATE
2. BURLINGTON NORTHERN OWNS A STRIP OF LAND FIVE FEET NORTH OF THE NAVISTAR PROPERTY ADJACENT TO THE SLOUGH.
3. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION.
4. UNDERGROUND SEWER AND WATER LINES SHOWN ARE APPROXIMATE.
5. SEWER AND WATER LINE LOCATIONS HAVE NOT BEEN SURVEYED.

LEGEND

- UTILITY POLE
- FENCE
- RAILROAD TRACKS
- EXISTING STRUCTURE/BUILDING
- P/A PAVED AREA
- TREE
- TREE LINE
- APPROXIMATE PROPERTY LINE

SOURCE: ABRAMS AERIAL SURVEY CORPORATION, LANSING MICHIGAN. ABRAMS CONTRACT A.A.S.C. 6?437. DATE OF PHOTOGRAPHY JULY 26, 1994. GRADE CONTOUR INTERVAL = 2'
HORIZONTAL CONTROL GRID SITE SPECIFIC. SITE ELEVATIONS BASED ON U.S.G.S. ELEVATIONS.

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Environment and Infrastructure
A Heidemij Company

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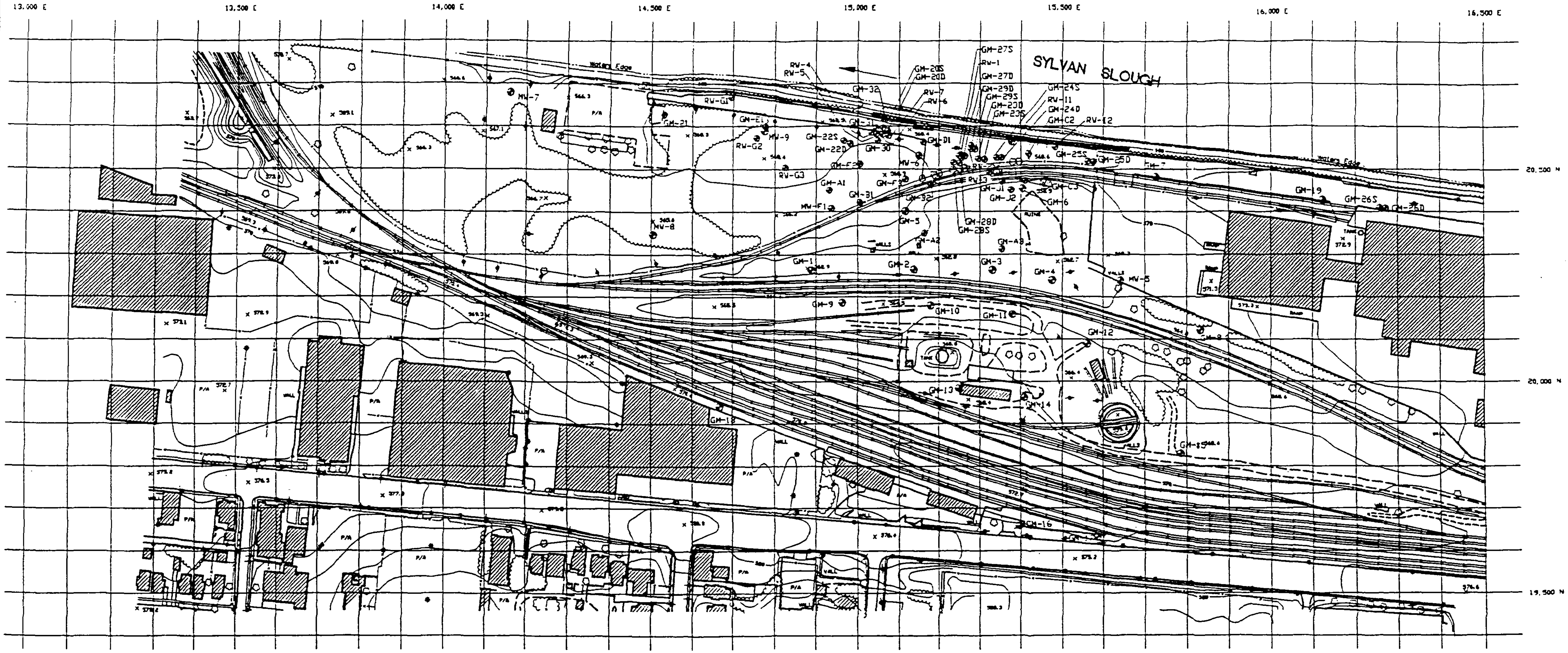
REV. NO	DATE	DESCRIPTION	BY	APPR.

DRAFTED BY: [illegible] DATE: 1/21/1997
CHECKED BY: DATE:
APPROVED BY: M3H DATE: 3/11/97
DATE: 3/5/97

SITE FEATURES

PRODUCT RECOVERY SYSTEM
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

FIGURE 2



LEGEND

- MONITORING WELL/NUMBER
- FENCE
- RAILROAD TRACKS
- EXISTING STRUCTURE/BUILDING
- SPOT ELEVATION AT GRADE
- EXISTING GRADE CONTOUR
- UTILITY POLE
- P/A PAVED AREA
- TREE
- TREE LINE
- WATERS EDGE

120 0 120 240

SCALE IN FEET

SOURCE: ABRAM AERIAL SURVEY CORPORATION, LANSING MICHIGAN. ABRAMS CONTRACT A.A.S.C. #25637. DATE OF PHOTOGRAPHY JULY 28, 1994. GRADE CONTOUR INTERVAL = 2'.

HORIZONTAL CONTROL GRID SITE SPECIFIC. SITE ELEVATIONS BASED ON U.S.G.S. ELEVATIONS.

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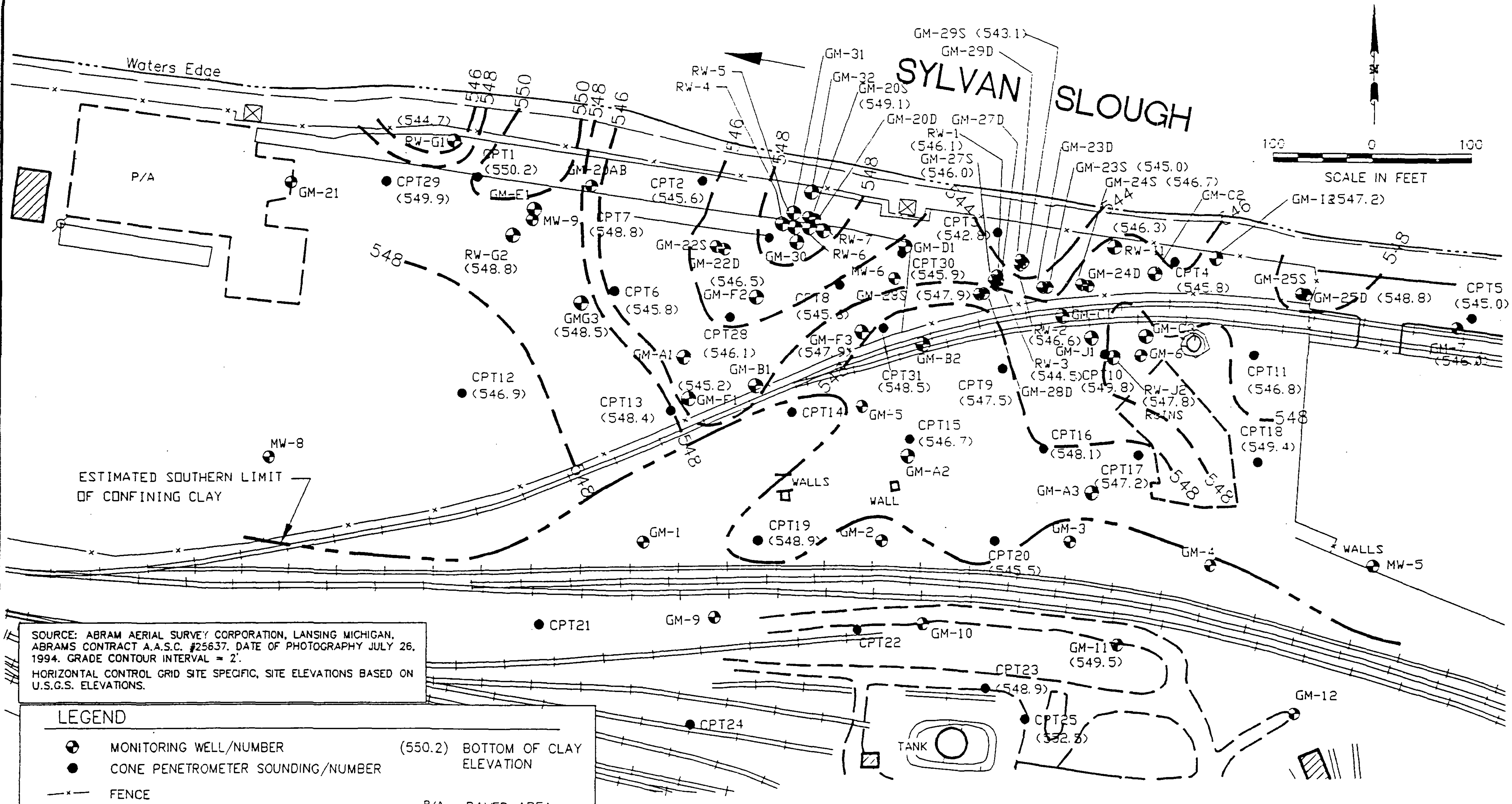
REV. NO.	DATE	DESCRIPTION	BY	APPR.

APPROVED BY: MJH DATE: 3/12/97

MONITORING WELL LOCATION MAP

PRODUCT RECOVERY SYSTEM
SYLVANSLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

FIGURE 3



SOURCE: ABRAM AERIAL SURVEY CORPORATION, LANSING MICHIGAN, ABRAMS CONTRACT A.A.S.C. #25637. DATE OF PHOTOGRAPHY JULY 26, 1994. GRADE CONTOUR INTERVAL = 2'.
HORIZONTAL CONTROL GRID SITE SPECIFIC, SITE ELEVATIONS BASED ON U.S.G.S. ELEVATIONS.

LEGEND

	MONITORING WELL/NUMBER	(550.2)	BOTTOM OF CLAY ELEVATION
	CONE PENETROMETER SOUNDING/NUMBER		
	FENCE	P/A	PAVED AREA
	RAILROAD TRACKS		TREE
	EXISTING STRUCTURE/BUILDING		TREE LINE
546	BOTTOM OF CLAY CONTOUR (ESTIMATED)		WATERS EDGE

GERAGHTY & MILLER, INC.
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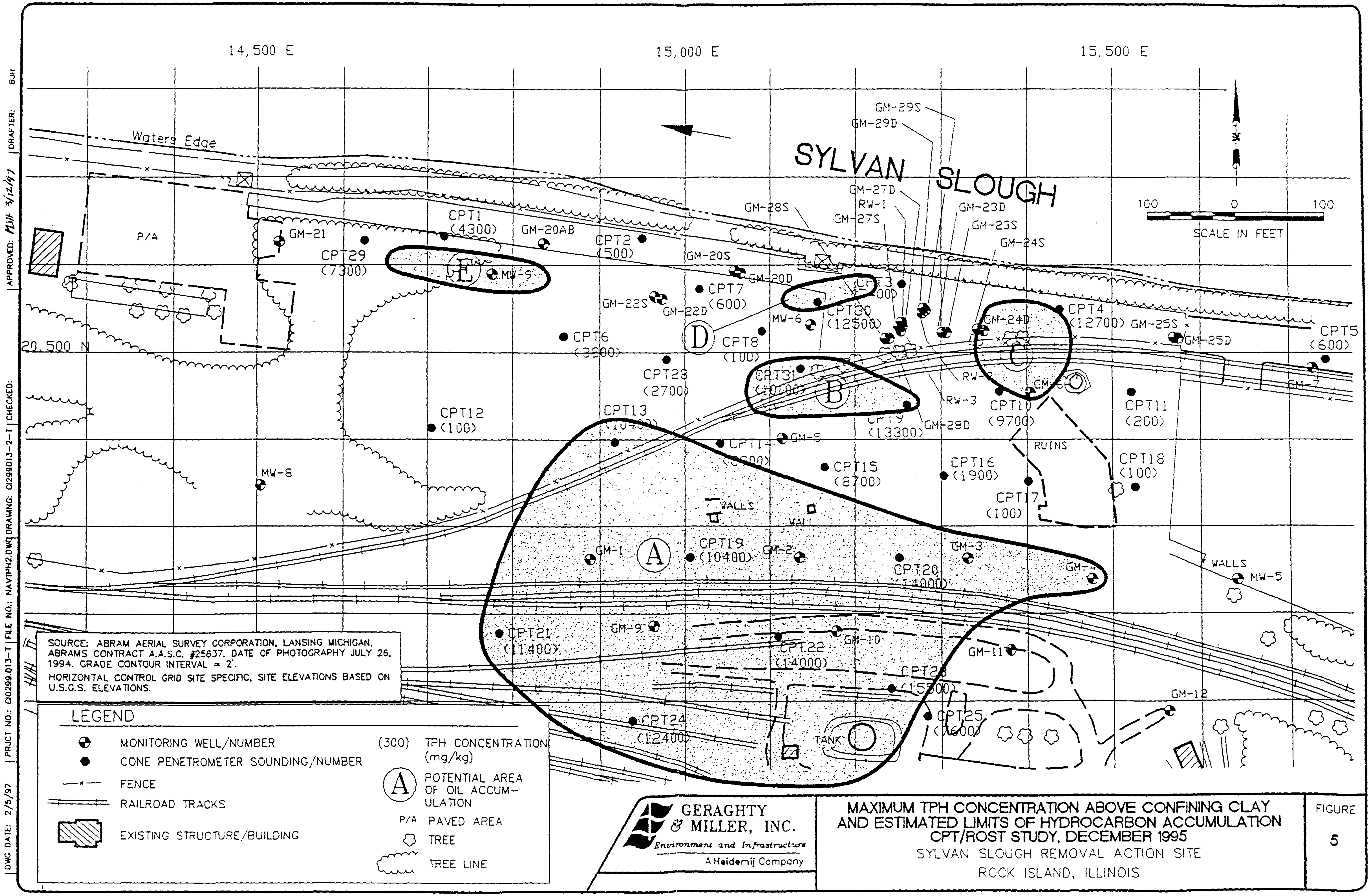
STRUCTURAL CONTOURS OF BASE OF CLAY

SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

FIGURE 4

DWG DATE: 2/24/97 | PRJCT NO.: CI0299.013 | FILE NO.: NAVTCLAY.DWG DRAWING: CI299013-1-1 CHECKED: | APPROVED: MJH 3/12/97 | DRAFTER: BJH



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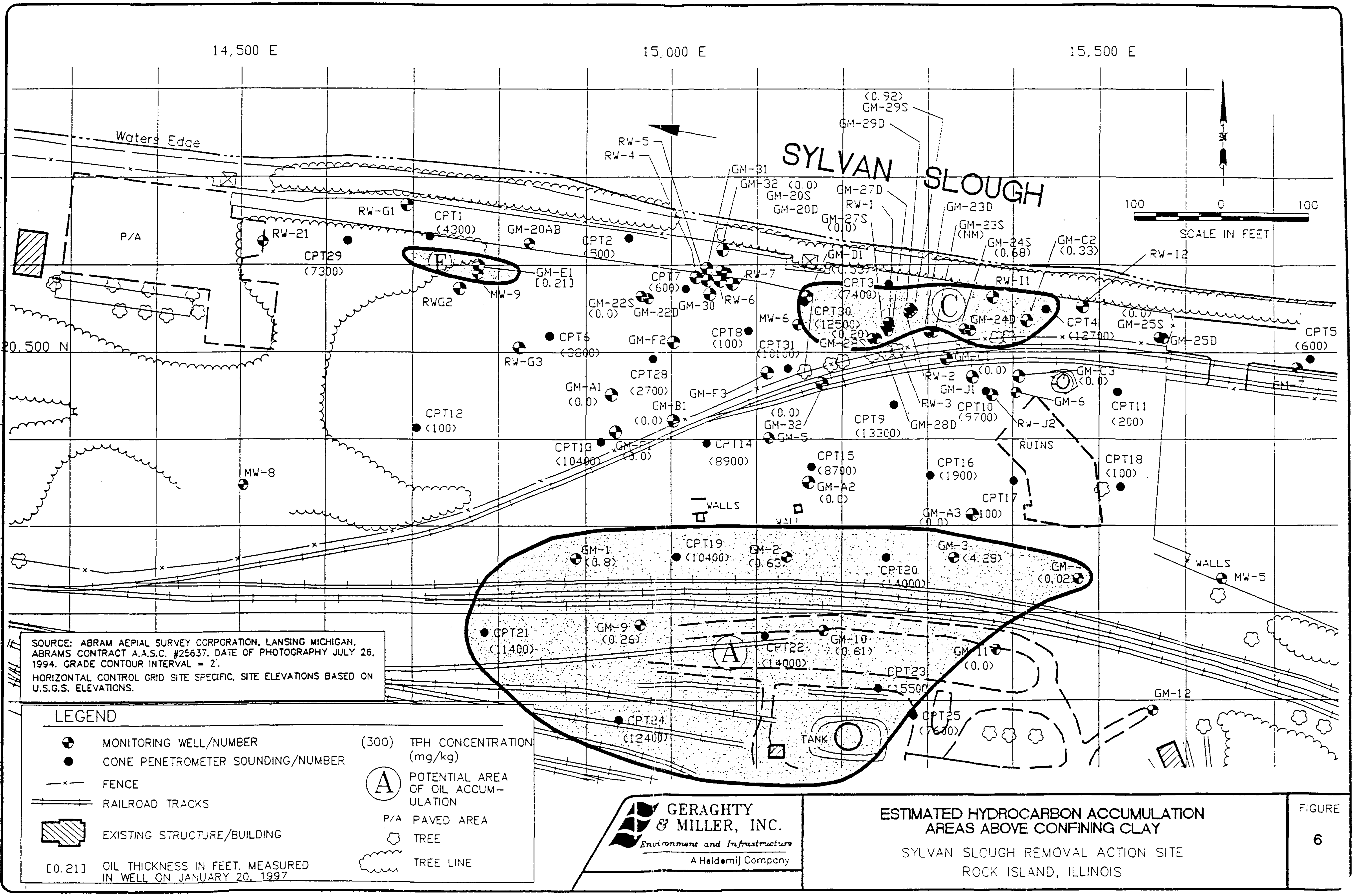
MAXIMUM TPH CONCENTRATION ABOVE CONFINING CLAY AND ESTIMATED LIMITS OF HYDROCARBON ACCUMULATION CPT/ROST STUDY, DECEMBER 1995
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

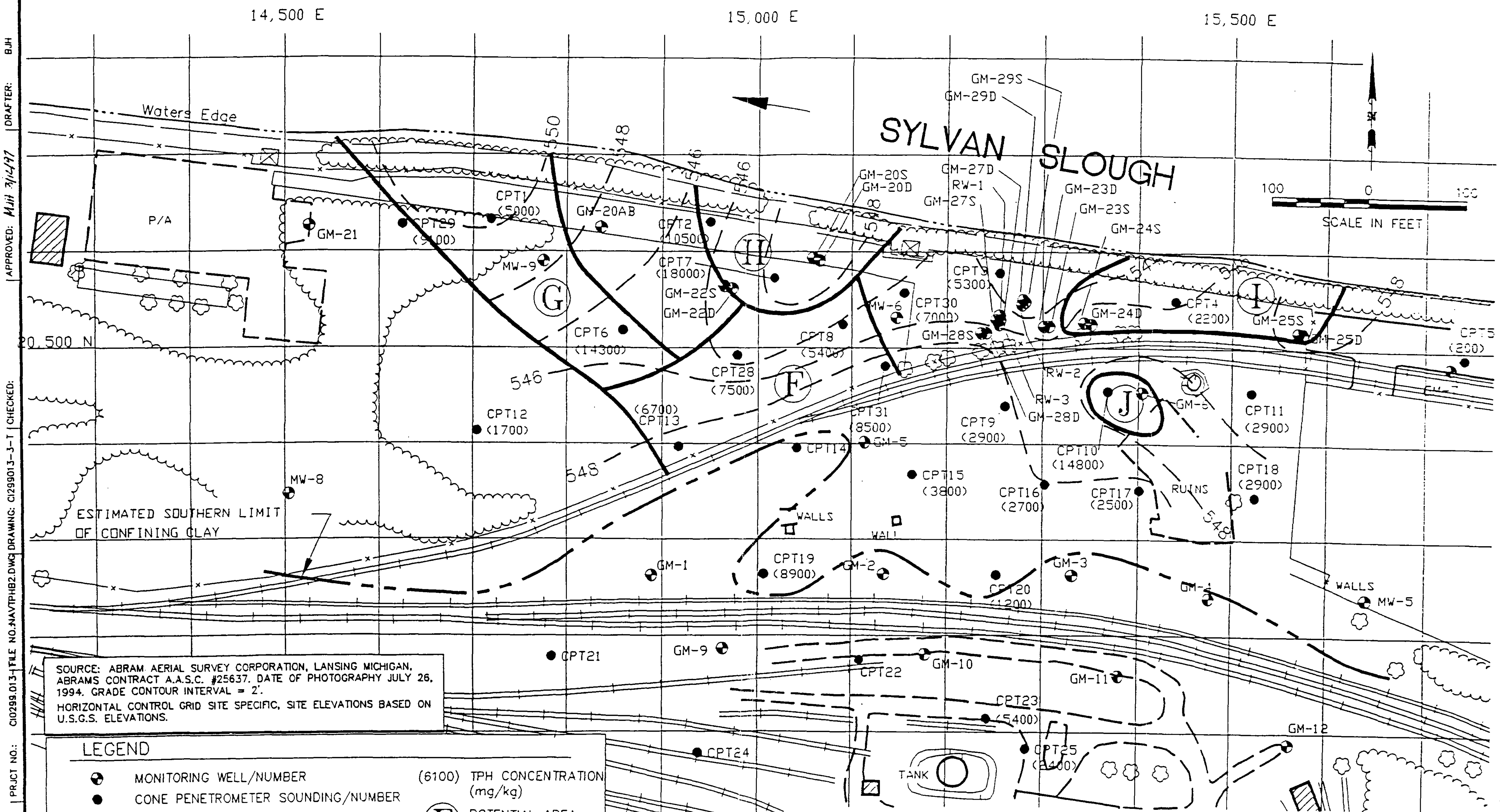
FIGURE 5



ESTIMATED HYDROCARBON ACCUMULATION AREAS ABOVE CONFINING CLAY

SYLVAN SLOUGH REMOVAL ACTION SITE

ROCK ISLAND, ILLINOIS



SOURCE: ABRAM AERIAL SURVEY CORPORATION, LANSING MICHIGAN, ABRAMS CONTRACT A.A.S.C. #25637. DATE OF PHOTOGRAPHY JULY 26, 1994. GRADE CONTOUR INTERVAL = 2'.
HORIZONTAL CONTROL GRID SITE SPECIFIC, SITE ELEVATIONS BASED ON U.S.G.S. ELEVATIONS.

LEGEND

- MONITORING WELL/NUMBER
- CONE PENETROMETER SOUNDING/NUMBER
- FENCE
- RAILROAD TRACKS
- EXISTING STRUCTURE/BUILDING
- 546 BOTTOM OF CLAY CONTOUR(ESTIMATED) BASED ON BORINGS AND WELLS INSTALLED THROUGH DECEMBER 1995
- (6100) TPH CONCENTRATION (mg/kg)
- F POTENTIAL AREA OF OIL ACCUMULATION
- P/A PAVED AREA
- TREE
- TREE LINE

GERAGHTY & MILLER, INC.
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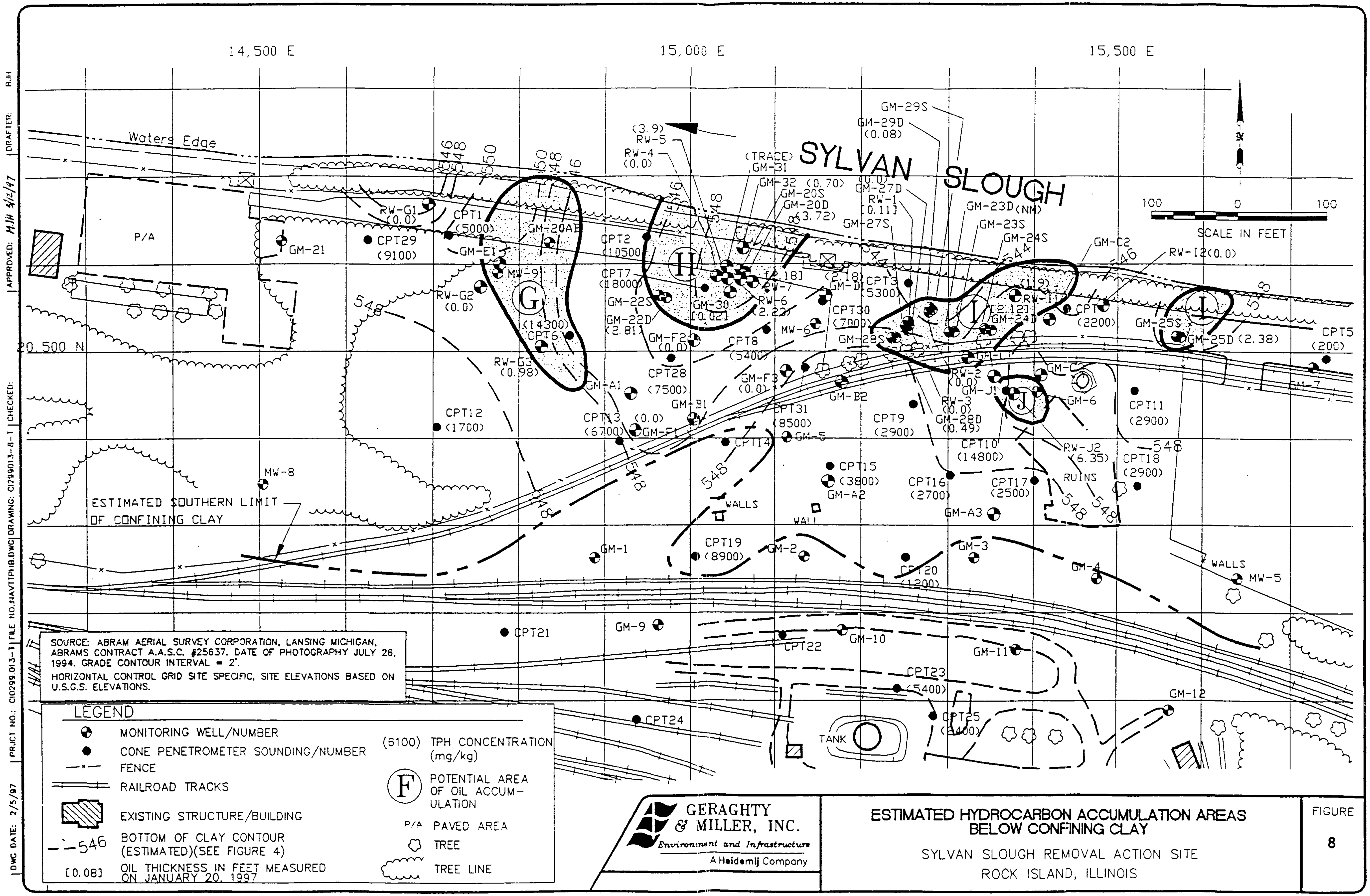
MAXIMUM TPH CONCENTRATION BELOW CONFINING CLAY AND ESTIMATED LIMITS OF HYDROCARBON ACCUMULATION CPT/ROST STUDY, DECEMBER 1995
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

FIGURE 7

DWG DATE: 2/5/97 | PRJCT NO.: CI0299.013 | FILE NO.NAVTPHB2.DWG | DRAWING: CI299013-3-T | CHECKED: | APPROVED: MJH 3/4/97 | DRAFTER: BJH


14,500 E
15,000 E
15,500 E
20,500 N
SYLVAN SLOUGH
Waters Edge
SCALE IN FEET
100 0 100
P/A
ESTIMATED SOUTHERN LIMIT OF CONFINING CLAY
WALLS
TANK
RUINS
SOURCE: ABRAM AERIAL SURVEY CORPORATION, LANSING MICHIGAN, ABRAMS CONTRACT A.A.S.C. #25637. DATE OF PHOTOGRAPHY JULY 26, 1994. GRADE CONTOUR INTERVAL = 2'.
HORIZONTAL CONTROL GRID SITE SPECIFIC, SITE ELEVATIONS BASED ON U.S.G.S. ELEVATIONS.
LEGEND
MONITORING WELL/NUMBER
CONE PENETROMETER SOUNDING/NUMBER
FENCE
RAILROAD TRACKS
EXISTING STRUCTURE/BUILDING
546 BOTTOM OF CLAY CONTOUR (ESTIMATED)(SEE FIGURE 4)
[0.08] OIL THICKNESS IN FEET MEASURED ON JANUARY 20, 1997
(6100) TPH CONCENTRATION (mg/kg)
F POTENTIAL AREA OF OIL ACCUMULATION
P/A PAVED AREA
TREE
TREE LINE
GERAGHTY & MILLER, INC.
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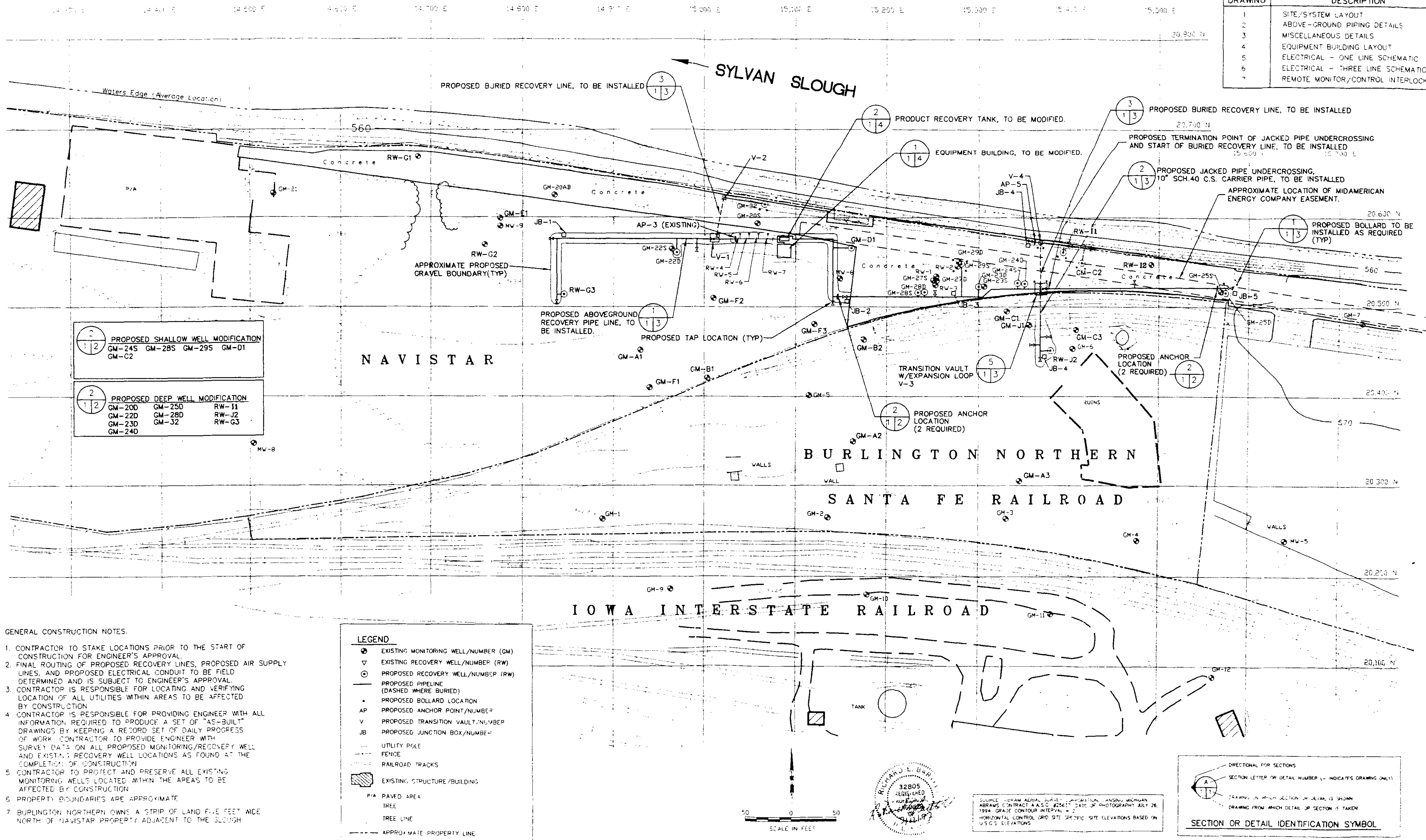
ESTIMATED HYDROCARBON ACCUMULATION AREAS BELOW CONFINING CLAY
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS
FIGURE 8
DWG DATE: 2/5/97
PRJCT NO.: CI0299.013-1
FILE NO.: AVTPH8.DWG
DRAWING: CI299013-8-1
APPROVED: MJH 3/12/97
DRAFTER: RJH



DRAWING INDEX

DRAWING	DESCRIPTION
1	SITE/SYSTEM LAYOUT
2	ABOVE-GROUND PIPING DETAILS
3	MISCELLANEOUS DETAILS
4	EQUIPMENT BUILDING LAYOUT
5	ELECTRICAL - ONE LINE SCHEMATIC
6	ELECTRICAL - THREE LINE SCHEMATIC
7	REMOTE MONITOR/CONTROL INTERLOCK

GENERAL CONSTRUCTION NOTES.

1. CONTRACTOR TO STAKE LOCATIONS PRIOR TO THE START OF CONSTRUCTION FOR ENGINEER'S APPROVAL.
2. FINAL ROUTING OF PROPOSED RECOVERY LINES, PROPOSED AIR SUPPLY LINES, AND PROPOSED ELECTRICAL CONDUIT TO BE FIELD DETERMINED AND IS SUBJECT TO ENGINEER'S APPROVAL.
3. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING LOCATION OF ALL UTILITIES WITHIN AREAS TO BE AFFECTED BY CONSTRUCTION
4. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ENGINEER WITH ALL INFORMATION REQUIRED TO PRODUCE A SET OF "AS-BUILT" DRAWINGS BY KEEPING A RECORD SET OF DAILY PROGRESS OF WORK. CONTRACTOR TO PROVIDE ENGINEER WITH SURVEY DATA ON ALL PROPOSED MONITORING/RECOVERY WELL AND EXISTING RECOVERY WELL LOCATIONS AS FOUND AT THE COMPLETION OF CONSTRUCTION
5. CONTRACTOR TO PROTECT AND PRESERVE ALL EXISTING MONITORING WELLS LOCATED WITHIN THE AREAS TO BE AFFECTED BY CONSTRUCTION
6. PROPERTY BOUNDARIES ARE APPROXIMATE
7. BURLINGTON NORTHERN OWNS A STRIP OF LAND FIVE FEET WIDE NORTH OF NAVISTAR PROPERTY ADJACENT TO THE SLOUGH

LEGEND

- EXISTING MONITORING WELL/NUMBER (GM)
- EXISTING RECOVERY WELL/NUMBER (RW)
- PROPOSED RECOVERY WELL/NUMBER (RW)
- PROPOSED PIPELINE (DASHED WHERE BURIED)
- PROPOSED BOLLARD LOCATION
- AP PROPOSED ANCHOR POINT/NUMBER
- V PROPOSED TRANSITION VAULT/NUMBER
- JB PROPOSED JUNCTION BOX/NUMBER
- UTILITY POLE
- FENCE
- RAILROAD TRACKS
- EXISTING STRUCTURE/BUILDING
- P/A PAVED AREA
- TREE
- TREE LINE
- APPROXIMATE PROPERTY LINE

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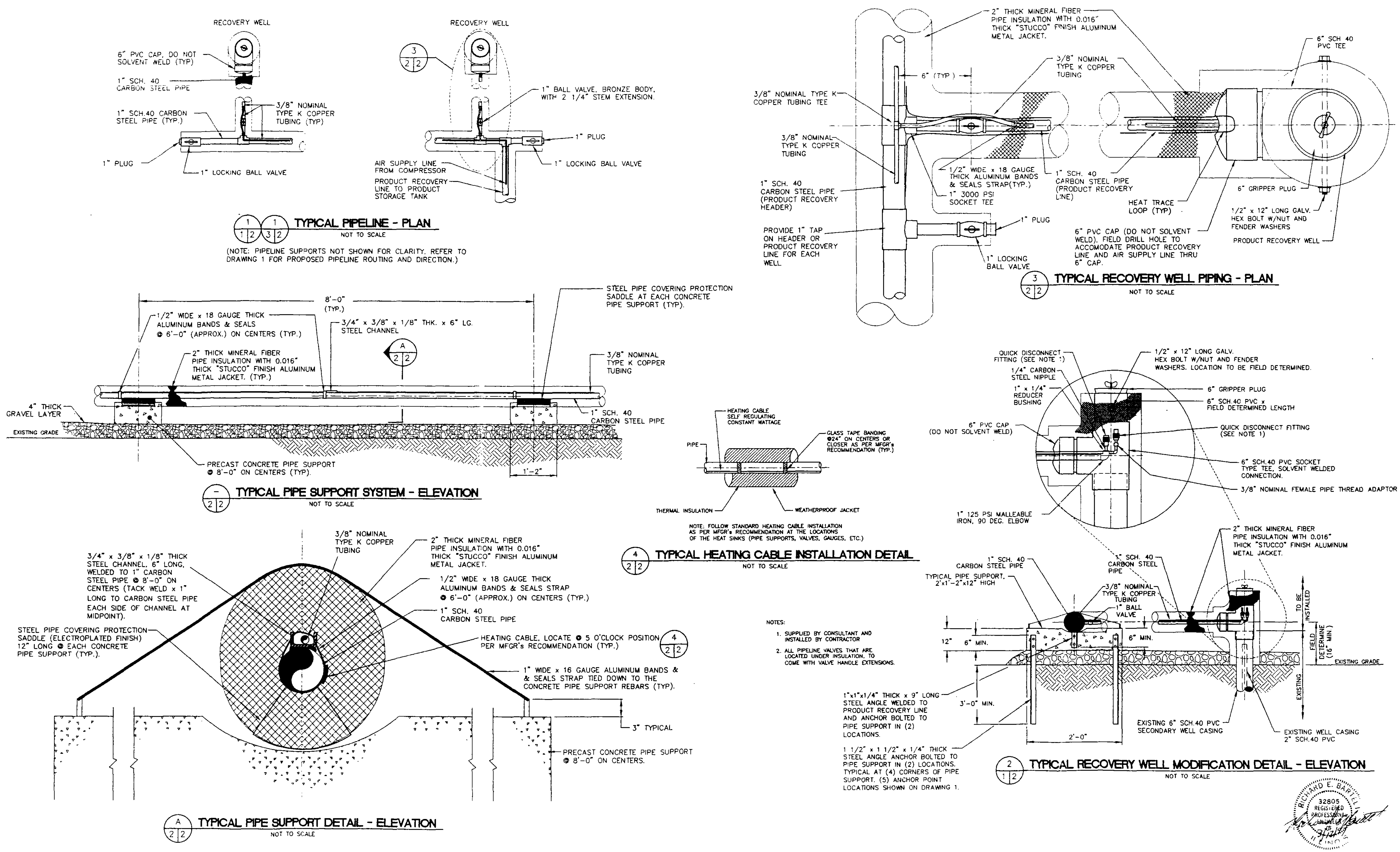
REV. NO.	DATE	DESCRIPTION	BY	APPR

PROJECT NO. CI0299.014	FILE NO. NAVSST01.DWG
DRAWING NO. CI299014-D01-7	PLOT SCALE 1=50
DRAFTED BY: B. HERRMANN	DATE 1/13/97
CHECKED BY: MGZ	DATE 2/14/97
APPROVED BY: M. HAMPER	DATE 3/12/97
LAST REVISION BY: BJH	DATE 2/5/97

SITE/SYSTEM LAYOUT

PRODUCT RECOVERY SYSTEM
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

DRAWING 1



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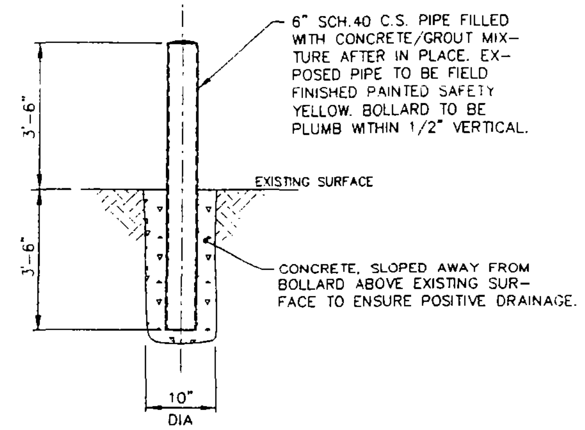
REV. NO.	DATE	DESCRIPTION	BY	APPR.

PROJECT NO. OI0299.014 — FILE NO. NAVSS703.DWG
DRAWING NO. OI2914-D03-T — PLOT SCALE 1=18
DRAFTED BY: D. HERRMANN — DATE: 1/30/97
CHECKED BY: M.G.Z. — DATE: 3/19/97
APPROVED BY: M. HAMMEL — DATE: 3/19/97
LAST REVISION BY: BJH — DATE: 1/27/97

ABOVE-GROUND PIPING DETAILS
PRODUCT RECOVERY SYSTEM
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

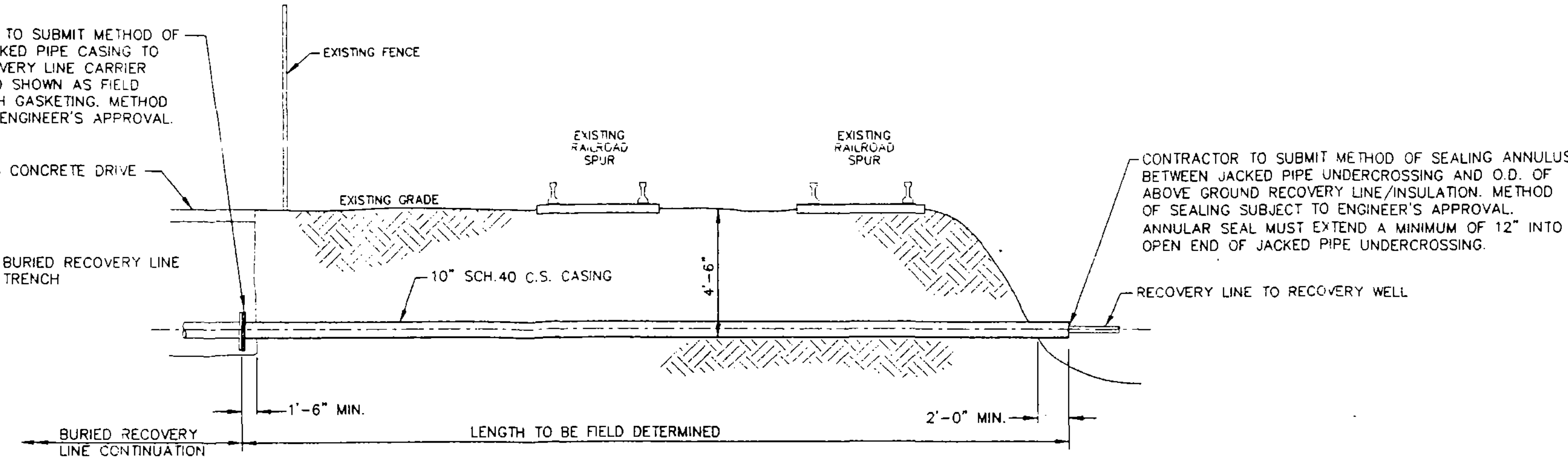
DRAWING
2



1 | 1 3 — BOLLARD DETAIL - ELEVATION

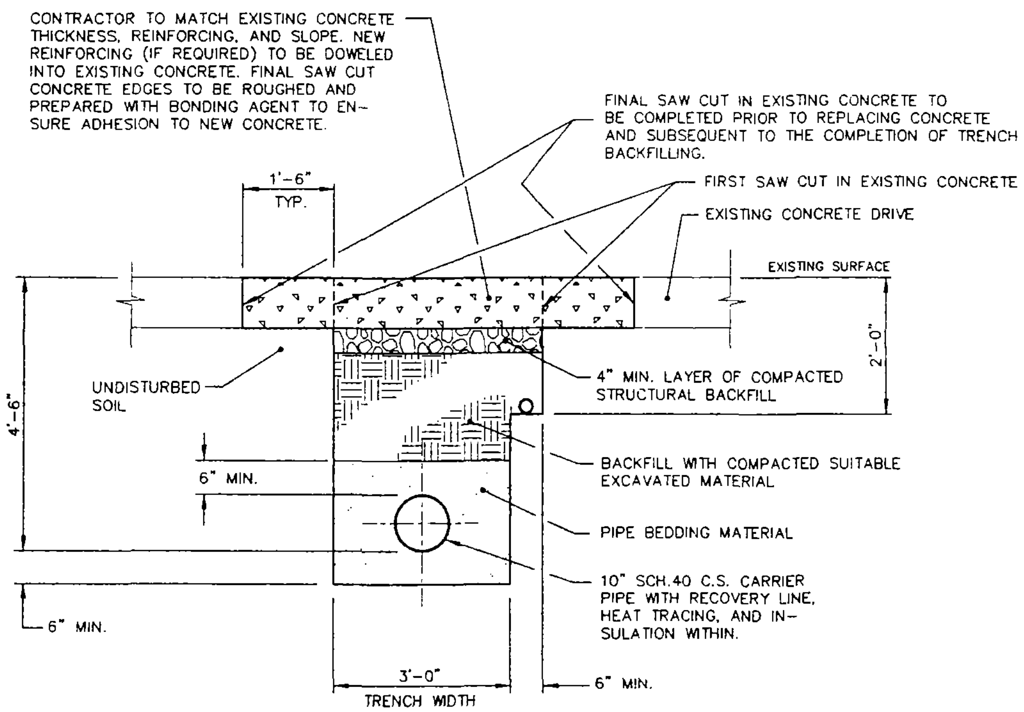
NOT TO SCALE

NOTE: PLACEMENT OF BOLLARDS TO BE AS SHOWN ON DRAWING 1 AND AT THE DIRECTION OF ENGINEER.



2 | 1 3 — JACKED PIPE UNDERCROSSING - ELEVATION

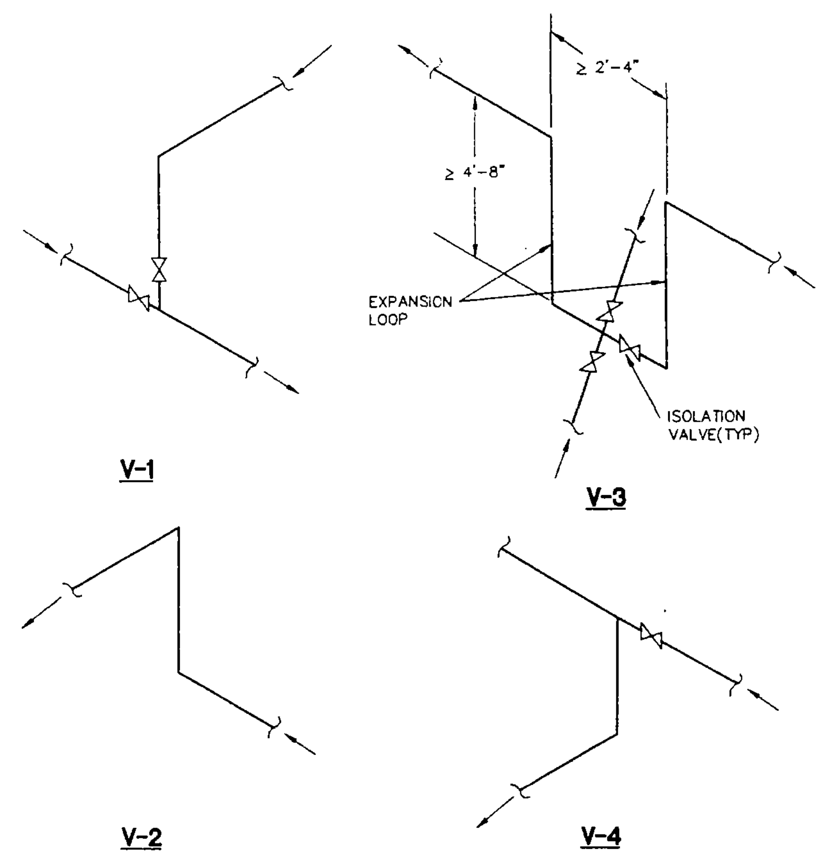
NOT TO SCALE



3 | 1 3 — BURIED RECOVERY LINE TRENCH - ELEVATION

NOT TO SCALE

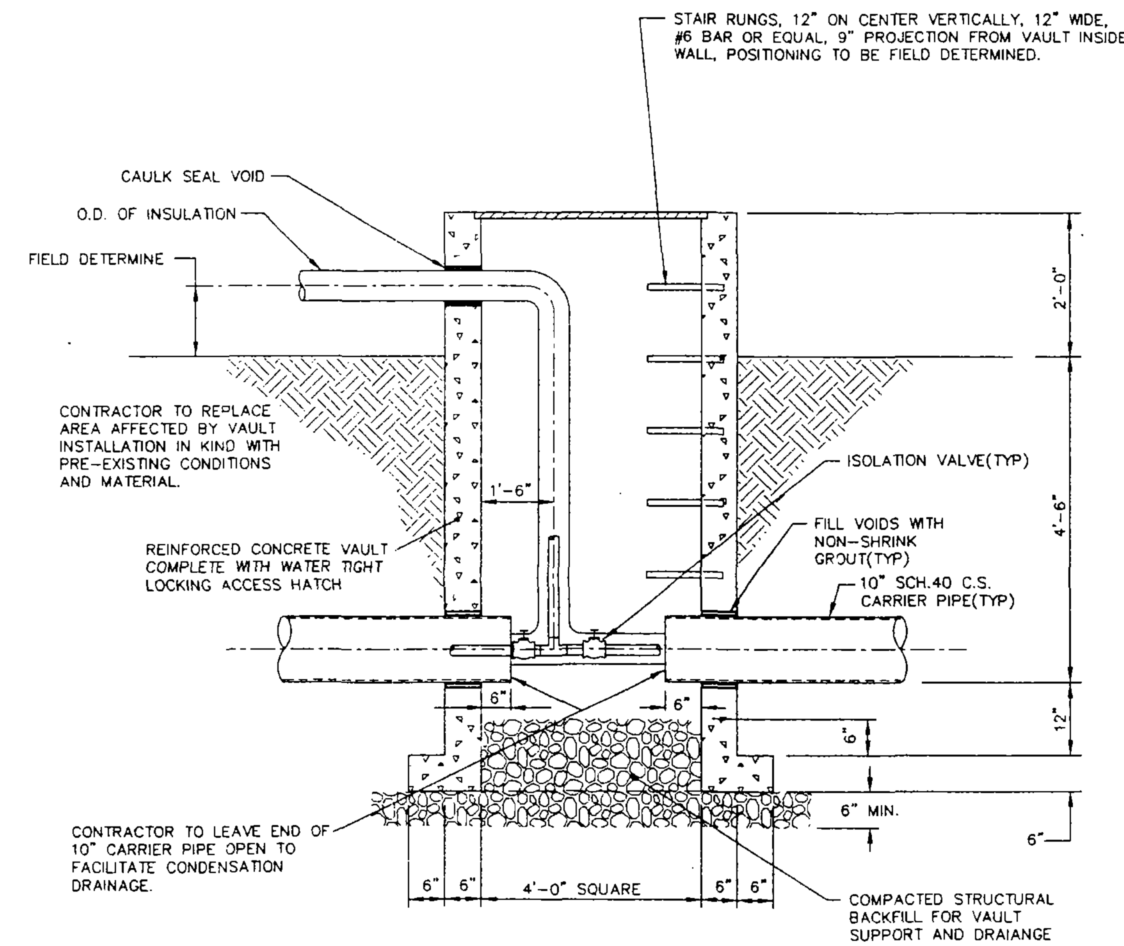
NOTE: PVC CONDUIT AND ASSOCIATED ELECTRICAL TRENCH BENCH ONLY REQUIRED IN TRENCH RUN BETWEEN GM-01 AND V-4. CARRIER PIPE TO SLOPE BACK TO TRANSITION VAULT FOR POSITIVE DRAINAGE.



4 | 1 3 — TRANSITION VAULT PIPING SCHEMATIC

NOT TO SCALE

NOTE: REFER TO DRAWING 1 FOR PROPOSED LOCATIONS OF EXPANSION LOOPS.



5 | 1 3 — TYPICAL TRANSITION VAULT DETAIL - ELEVATION

NOT TO SCALE

NOTE: REFER TO DRAWING 1 FOR SPECIFIC ORIENTATION OF TRANSITION VAULTS TO THE APPROPRIATE ABOVE GROUND AND BURIED RECOVERY LINES, AND FOR THE LOCATION OF VALVES.

RICHARD E. BARTLETT 32805 REGISTERED PROFESSIONAL ENGINEER ILLINOIS 9/12/97

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SCALE VERIFICATION: THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

REV. NO	DATE	DESCRIPTION	BY	APPR.

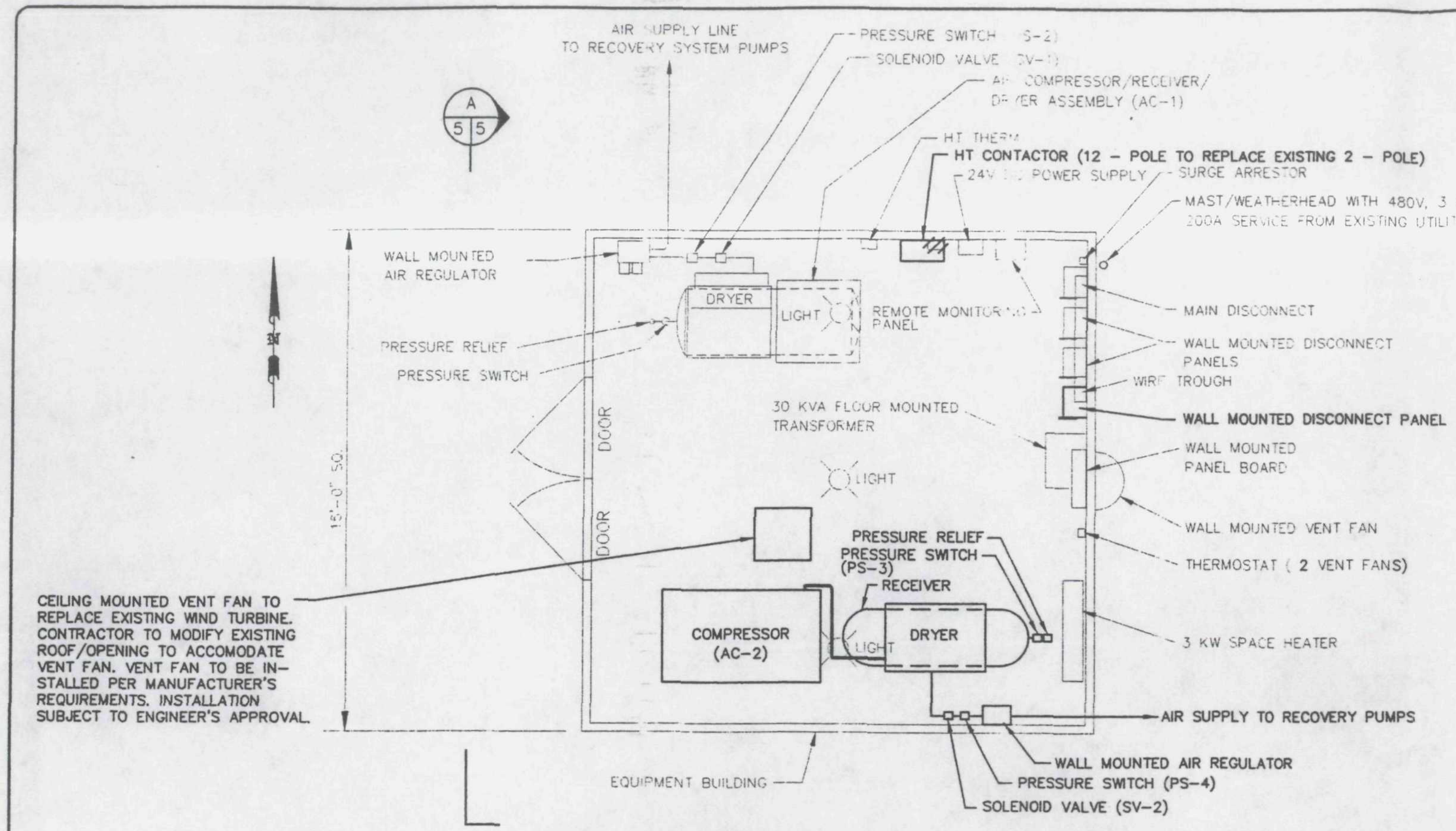
PROJECT NO. D0299.014	FILE NO. NAYSST04.DWG
DRAWING NO. D299014-004-T	PLOT SCALE 1=16
DRAFTED BY: B. HERRMANN	DATE: 1/23/97
CHECKED BY:	DATE:
APPROVED BY: K. HAMPER	DATE:
LAST REVISION BY: BJH	DATE: 1/27/97

MISCELLANEOUS DETAILS

PRODUCT RECOVERY SYSTEM

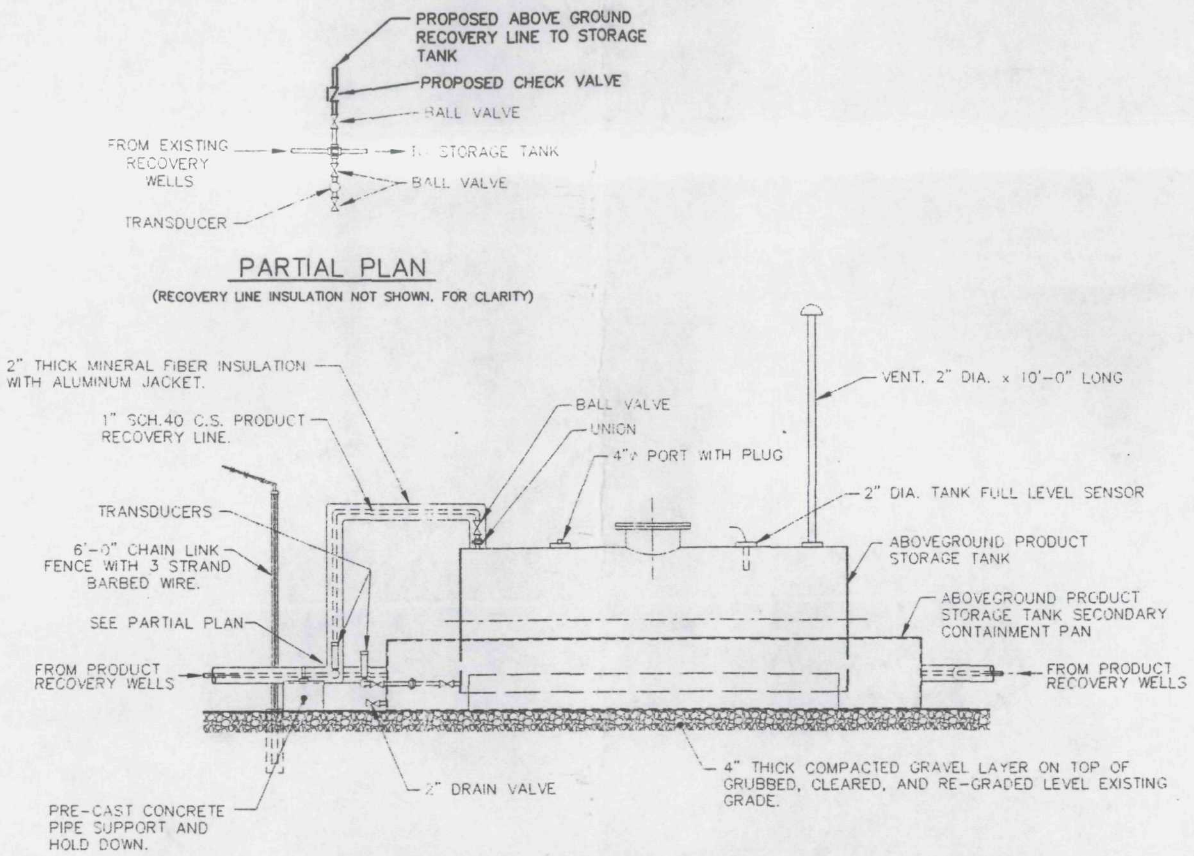
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

DRAWING 3



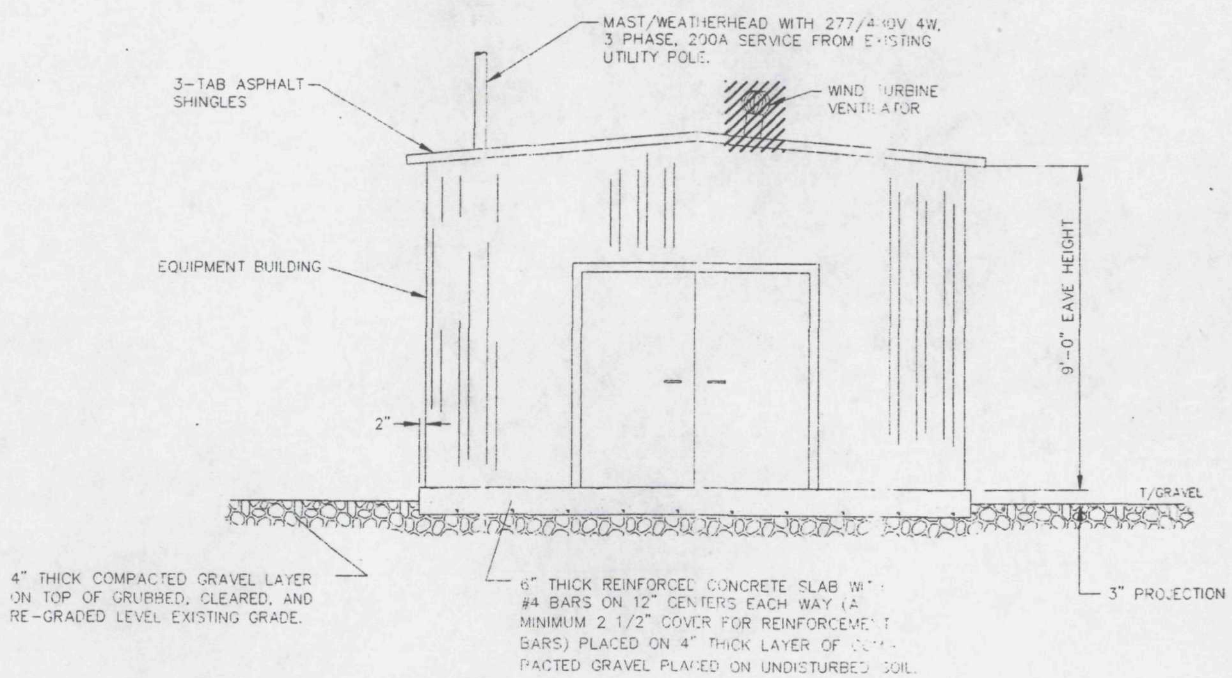
1/4 **EQUIPMENT BUILDING LAYOUT - PLAN**

NOT TO SCALE



2/4 **PRODUCT STORAGE TANK DETAIL**

NOT TO SCALE



A/4 **EQUIPMENT BUILDING - ELEVATION**

NOT TO SCALE

NOTE:
A. LIGHTER SHADED LINEWORK REPRESENTS EXISTING TO REMAIN OR TO BE MODIFIED UNDER THIS PHASE OF WORK AS DIRECTED IN DARK SHADED TEXT.
B. DARKER SHADED LINE WORK REPRESENTS NEW TO BE ADDED UNDER THIS PHASE OF WORK.
C. HATCHED AREAS REPRESENT ITEMS BEING RELOCATED OR DELETED. NOTES TO INDICATE DISPOSITION.

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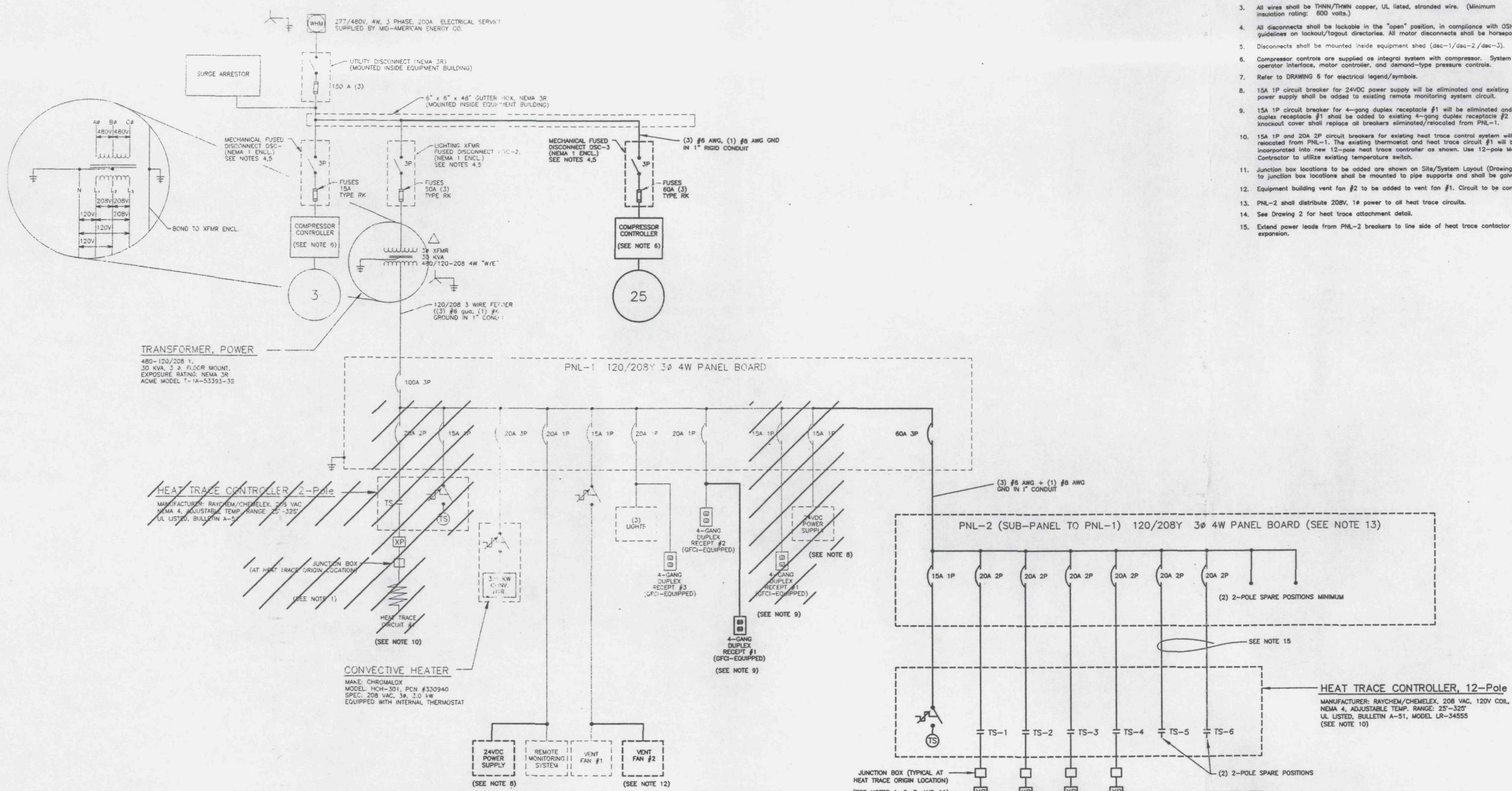
REV. NO.	DATE	DESCRIPTION	BY	APPR.

PROJECT NO.: OI0299.014	FILE NO: HAVSST05.DWG
DRAWING NO.: OI299014-D05-7	PLOT SCALE: 1=32
DRAFTED BY: B. HERRMANN	DATE: 1/23/97
CHECKED BY: M G L	DATE: 2/14/97
APPROVED BY: R. BARTELT	DATE: 2/14/97
LAST REVISION BY: BJH	DATE: 2/3/97

EQUIPMENT BUILDING LAYOUT
PRODUCT RECOVERY SYSTEM
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

DRAWING
4



ONE LINE SCHEMATIC

N.T.S.

NOTE:

A. LIGHTER SHADED LINE WORK REPRESENTS EXISTING EQUIPMENT/ELECTRICAL TO REMAIN OR TO BE MODIFIED UNDER THIS PHASE OF WORK AS DIRECTED IN DARK SHADED TEXT.
B. DARKER SHADED LINE WORK REPRESENTS NEW EQUIPMENT/ELECTRICAL TO BE ADDED UNDER THIS PHASE OF WORK.
C. HATCHED AREAS REPRESENT ITEMS BEING RELOCATED OR DELETED. NOTES TO INDICATE DISPOSITION.

NOTES

1. Heat trace circuit shall not exceed 540' in length, and shall be installed per vendor specifications.
2. All conduit shall be galvanized rigid, unless otherwise specified.
3. All wires shall be THNN/THWN copper, UL listed, stranded wire. (Minimum insulation rating: 600 volts.)
4. All disconnects shall be lockable in the "open" position, in compliance with OSHA 29CFR.120 guidelines on lockout/tagout directories. All motor disconnects shall be horsepower rated.
5. Disconnects shall be mounted inside equipment shed (dsc-1/dsc-2 /dsc-3).
6. Compressor controls are supplied as integral system with compressor. System will include: operator interface, motor controller, and demand-type pressure controls.
7. Refer to DRAWING 6 for electrical legend/symbols.
8. 15A 1P circuit breaker for 24VDC power supply will be eliminated and existing 24VDC power supply shall be added to existing remote monitoring system circuit.
9. 15A 1P circuit breaker for 4-gang duplex receptacle #1 will be eliminated and existing 4-gang duplex receptacle #1 shall be added to existing 4-gang duplex receptacle #2 circuit. Blank knockout cover shall replace all breakers eliminated/relocated from PNL-1.
10. 15A 1P and 20A 2P circuit breakers for existing heat trace control system will be relocated from PNL-1. The existing thermostat and heat trace circuit #1 will be incorporated into new 12-pole heat trace controller as shown. Use 12-pole Model LR-34555. Contractor to utilize existing temperature switch.
11. Junction box locations to be added are shown on Site/System Layout (Drawing 1). Conduit to junction box locations shall be mounted to pipe supports and shall be galvanized rigid type.
12. Equipment building vent fan #2 to be added to vent fan #1. Circuit to be controlled by existing thermostat.
13. PNL-2 shall distribute 208V, 1ø power to all heat trace circuits.
14. See Drawing 2 for heat trace attachment detail.
15. Extend power leads from PNL-2 breakers to line side of heat trace contactor for future expansion.

RICHARD E. BARTELT 32805 REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS 3/10/97

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REV. NO.	DATE	DESCRIPTION	BY	APPR.

PROJECT NO.: CI0299.014	FILE NO: NAVSST06.DWG
DRAWING NO.: CI29914-006-T	PLOT SCALE: 1=1
DRAFTED BY: B. HERRMANN	DATE: 1/23/97
CHECKED BY: M G Z	DATE: 2/14/97
APPROVED BY: M. HAMPER	DATE: 3/10/97
LAST REVISION BY: BJH	DATE: 2/3/97

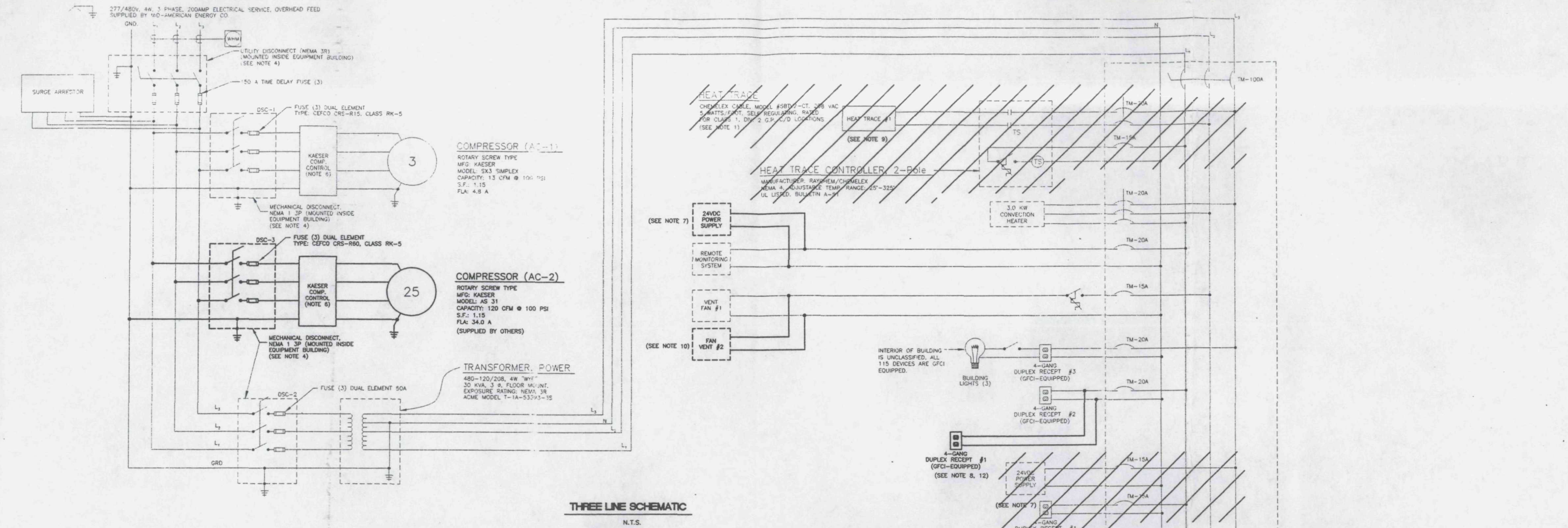
ELECTRICAL - ONE LINE SCHEMATIC

PRODUCT RECOVERY SYSTEM

SYLVAN SLOUGH REMOVAL ACTION SITE

ROCK ISLAND, ILLINOIS

DRAWING 5

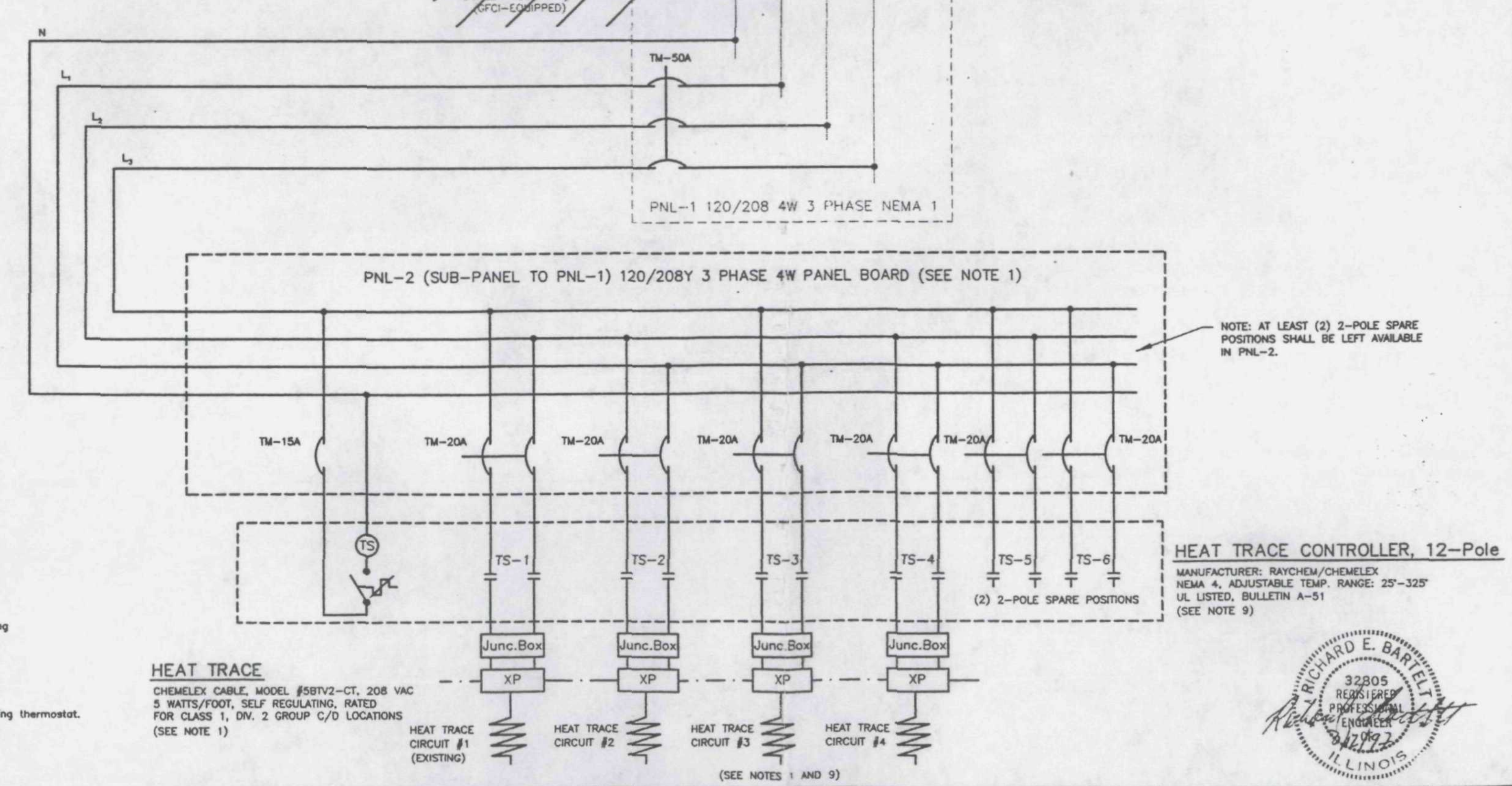


THREE LINE SCHEMATIC

N.T.S.

NOTE:

A. LIGHTER SHADED LINE WORK REPRESENTS EXISTING EQUIPMENT/WIRING TO REMAIN OR TO BE MODIFIED UNDER THIS PHASE OF WORK AS DIRECTED IN DARK SHADED TEXT.
B. DARKER SHADED LINE WORK REPRESENTS NEW EQUIPMENT/ELECTRICAL TO BE ADDED UNDER THIS PHASE OF WORK.
C. HATCHED AREAS REPRESENT ITEMS BEING RELOCATED OR DELETED. NOTES TO INDICATE DISPOSITION.



LEGEND

Symbol	Description	Symbol	Description
- - - - - -	EQUIPMENT ENCLOSURE		POWER TRANSFORMER
	CONNECTION		EARTH GROUND
TM-20A	MOLDED CASE (SIZE, #POLES) CIRCUIT BREAKER		CHASSIS GROUND
	FUSE	XP	DENOTES TRANSITION TO ELECTRICALLY CLASSIFIED AREA
30A	FUSED DISCONNECT (# INDICATES AMPACITY)		FULL VOLTAGE, NON-REVERSING (FVNR) MOTOR STARTER
	DISCONNECT (MECHANICAL/MANUAL)		THERMOSTAT CONTROL, ADJUSTABLE
WHM	WATT-HOUR METER SOCKET (FURNISHED BY UTILITY)	PNL	PANELBOARD
3.0	MOTOR # DENOTES HP	T	THERMAL
		TM	THERMAL MAGNETIC
		D	DISCONNECT
		A	AMP
		FLA	FULL LOAD AMP
		TS ⊣⊢	THERMOSTAT CONTACT
		(TS)	THERMOSTAT COIL/MULTIPOLE CONTROLLER

NOTES

1. Heat trace circuit shall not exceed 540' in length, and shall be installed per vendor specifications.
2. All conduit shall be galvinized rigid, unless otherwise specified.
3. All wires shall be THNN/THWN copper, UL listed, stranded wire. (Minimum insulation rating: 600 volts.)
4. All disconnects shall be lockable in the "open" position, in compliance with OSHA 29CFR.120 guidelines on lockout/tagout directories. All motor disconnects shall be horsepower rated.
5. Disconnects shall be mounted inside equipment shed (dsc-1/dsc-2/dsc-3).
6. Compressor controls are supplied as integral system with compressor. System will include: operator interface, motor controller, and demand-type pressure controls.
7. 15A 1P circuit breaker for 24VDC power supply will be eliminated and existing 24VDC power supply shall be added to existing remote monitoring system circuit.
8. 15A 1P circuit breaker for 4-gang duplex receptacle #1 will be eliminated and existing 4-gang Duplex receptacle #1 shall be added to existing 4-gang duplex receptacle #2 circuit.
9. 15A 1P and 20A 2P circuit breakers for existing heat trace control system will be relocated from PNL-1 to PNL-2. The existing thermostat and heat trace circuit #1 will be incorporated into new 12-pole heat trace controller as shown. Use 12-pole Model LR-34555.
10. Equipment building vent fan #2 to be added to vent fan #1. Circuit to be controlled by existing thermostat.
11. PNL-2 shall distribute 208V, 1ø power to all heat trace circuits.
12. Circuit breaker knockout covers shall be used to cover any unused breaker positions in PNL-1.

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REV. NO.	DATE	DESCRIPTION	BY	APPR.

PROJECT NO.: CI0299.014	FILE NO: NAVSST07.DWG
DRAWING NO.: CI29914-D07-T	PLOT SCALE: 1=1
DRAFTED BY: B. HERRMANN	DATE: 1/23/97
CHECKED BY: [illegible]	DATE: 3/14/97
APPROVED BY: A. HAMMER	DATE: 3/14/97
LAST REVISION BY: BJH	DATE: 2/3/97

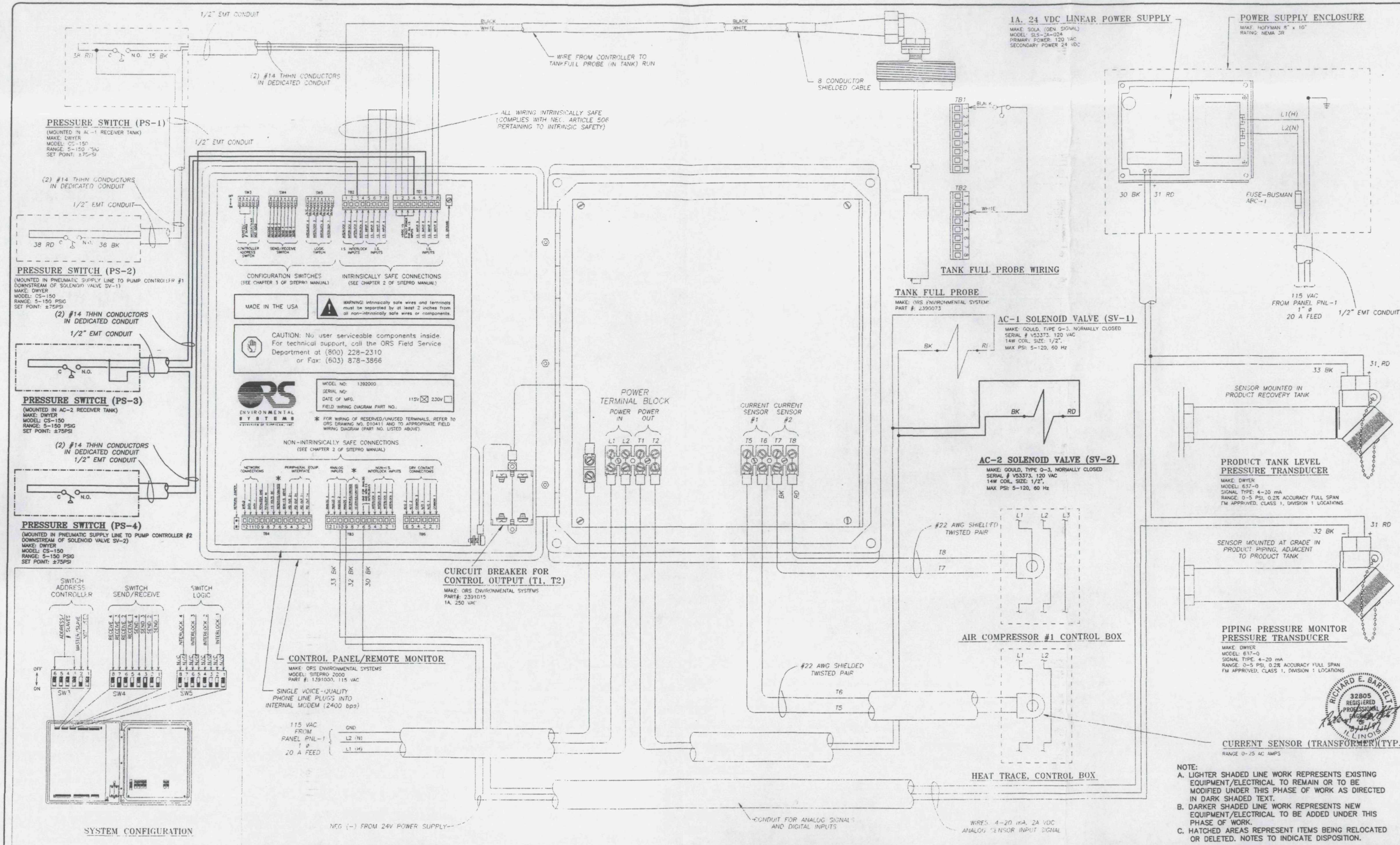
RICHARD E. BARTELT 32805 REGISTERED PROFESSIONAL ENGINEER ILLINOIS

ELECTRICAL - THREE LINE SCHEMATIC

PRODUCT RECOVERY SYSTEM

SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

DRAWING
6



NOTE:

A. LIGHTER SHADED LINE WORK REPRESENTS EXISTING EQUIPMENT/ELECTRICAL TO REMAIN OR TO BE MODIFIED UNDER THIS PHASE OF WORK AS DIRECTED IN DARK SHADED TEXT.
B. DARKER SHADED LINE WORK REPRESENTS NEW EQUIPMENT/ELECTRICAL TO BE ADDED UNDER THIS PHASE OF WORK.
C. HATCHED AREAS REPRESENT ITEMS BEING RELOCATED OR DELETED. NOTES TO INDICATE DISPOSITION.

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SCALE VERIFICATION
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.
USE TO VERIFY FIGURE REPRODUCTION SCALE

REV. NO.	DATE	DESCRIPTION	BY	APPR.

PROJECT NO.: CI0299.014	FILE NO: NAVSSTOB.DWG
DRAWING NO.: CI299014-008-7	PLOT SCALE:1=5
DRAFTED BY: B. HERRMANN	DATE: 1/23/97
CHECKED BY: MSL	DATE: 2/4/97
APPROVED BY: W. Hoenfel	DATE: 3/10/97
LAST REVISION BY: BJH	DATE: 2/3/97

REMOTE MONITOR/CONTROL INTERLOCK POINT TO POINT WIRING DIAGRAM
PRODUCT RECOVERY SYSTEM
SYLVAN SLOUGH REMOVAL ACTION SITE
ROCK ISLAND, ILLINOIS

DRAWING
7

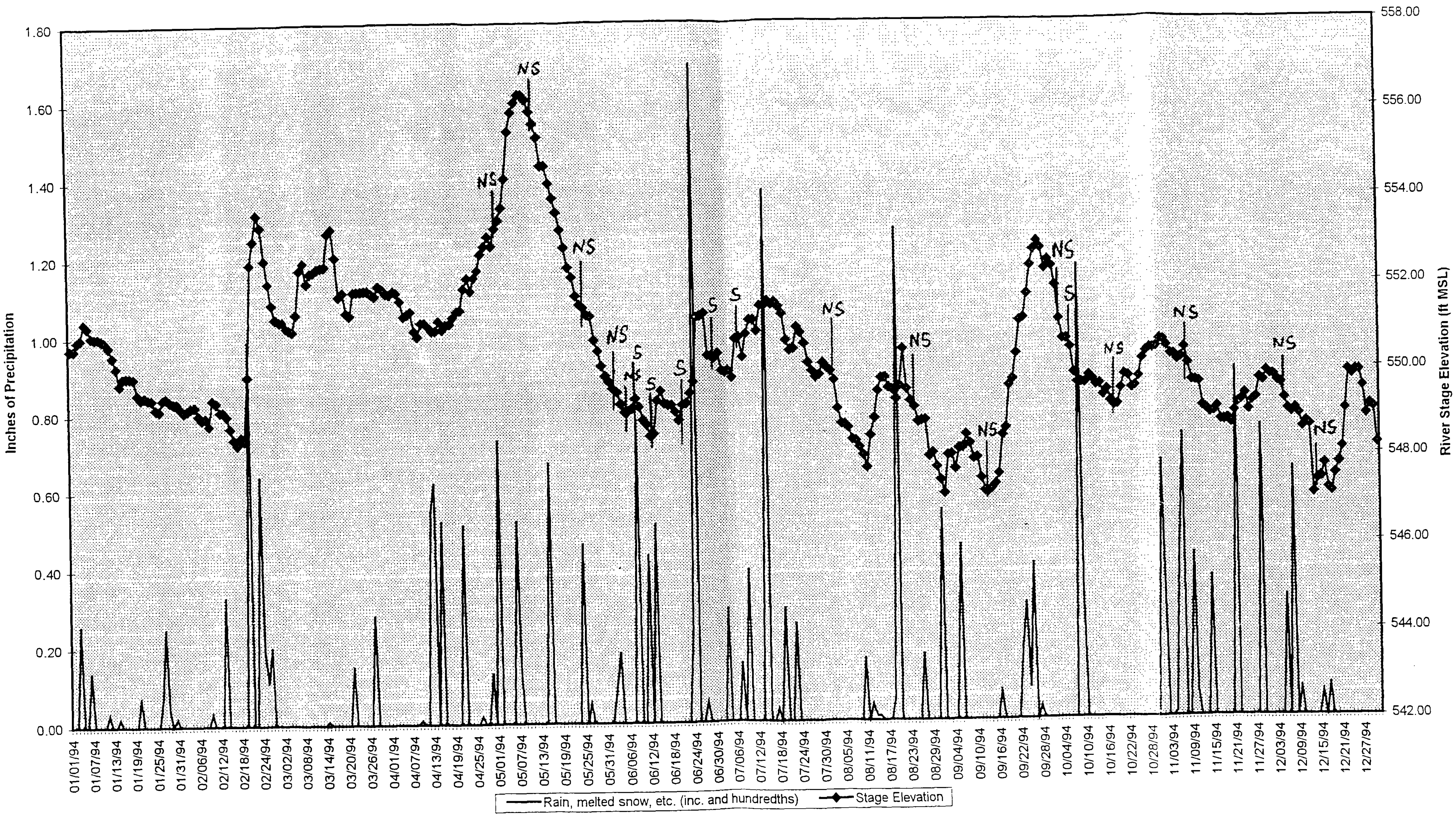
APPENDIX A

MISSISSIPPI RIVER STAGE RECORDS

1994-1996 Daily Precipitation and Daily Average River Stage Plots

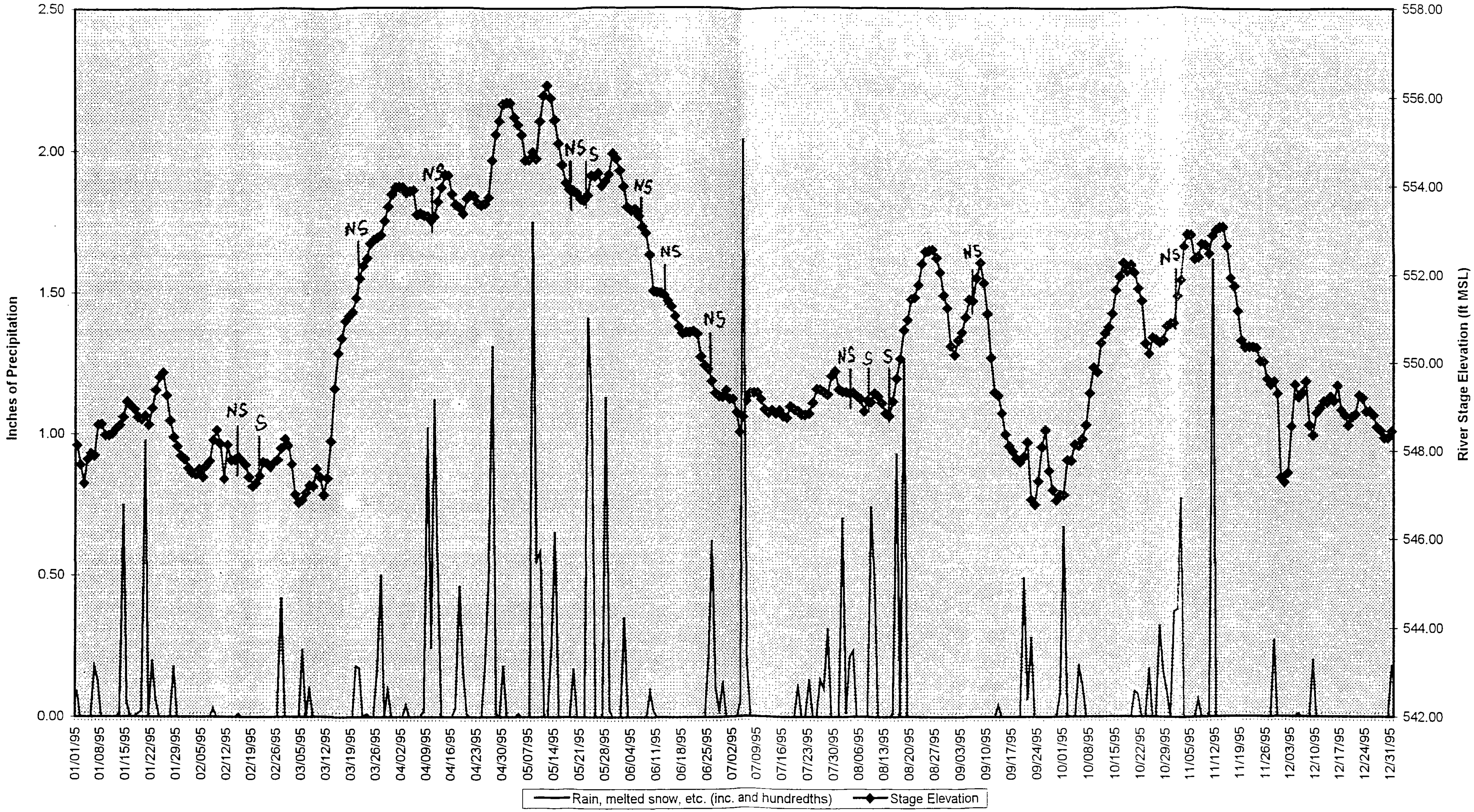
Rock Island, Illinois, Lock and Dam No. 15

PLOT OF DAILY PRECIPITATION AND DAILY AVERAGE RIVER STAGE-1994
ROCK ISLAND, ILLINOIS, LOCK AND DAM NO. 15



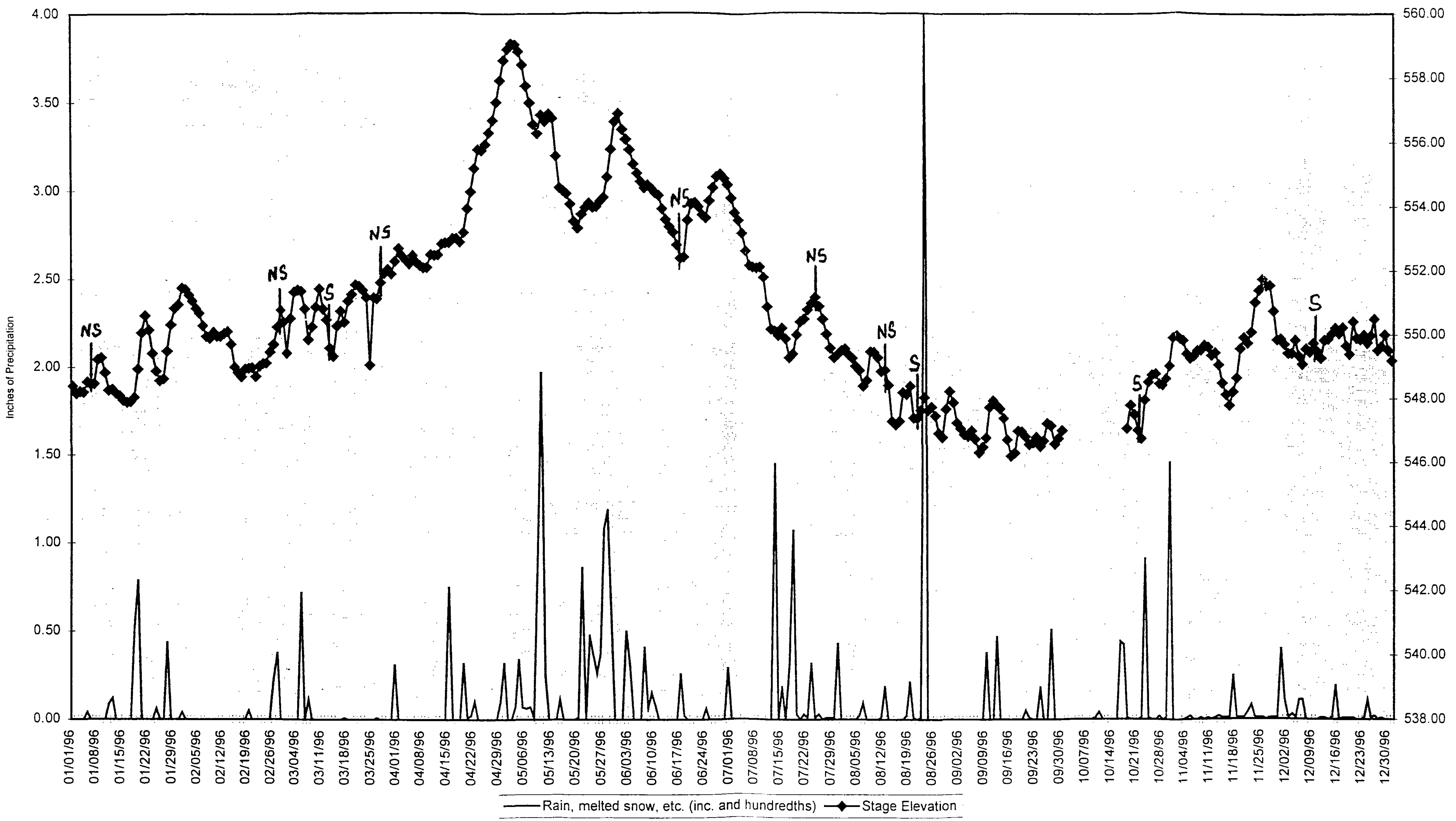
g:\aproject\Navistar\ci0299.013\data\Precp121.xls[1994 chart]

PLOT OF DAILY PRECIPITATION AND DAILY AVERAGE RIVER STAGE-1995
ROCK ISLAND, ILLINOIS, LOCK AND DAM NO. 15



g:\aproject\Navistar\ci0299.013\data\Precp121.xls[1995 chart]

PLOT OF DAILY PRECIPITATION AND DAILY AVERAGE RIVER STAGE-1996
ROCK ISLAND, ILLINOIS, LOCK AND DAM NO. 15



g:\aproject\Navistar\ci0299.013\data\Precp121.xls[1996 chart]

Coast Guard Inspection Records

SYLVAN SLOUGH MAN/BOAT HOURS

NAME	DATE	BOAT HRS.	VEHICLE HRS.	TOTAL HRS.	
MST2 SIMM	Ø2MAY94	Ø	1	2	NS
PS1 CALABRO	Ø2MAY94	Ø	1	2	NS
PS2 WILLIAMS	Ø2MAY94	Ø	1	2	NS
MKC OLSON	Ø2MAY94	2	.5	4	NS
MST2 SIMM	Ø2MAY94	2	.5	4	NS
PS1 CALABRO	Ø2MAY94	2	.5	4	NS
PS2 WILLIAMS	Ø2MAY94	2	.5	4	NS
MST2 SIMM	11MAY94	Ø	1	2	NS
MST2 SIMM	24MAY94	2.5	.5	3	NS
BM2 DODGE	24MAY94	2.5	.5	3	NS
MKC OLSON	24MAY94	2.5	.5	3	NS
MST2 SIMM	Ø3JUN94	~~2.0~~	2.0	4	NS
BM2 DODGE	Ø3JUN94	~~2.0~~	2.0	4	NS
MST2 SIMM	Ø7JUN94	Ø	1	1	NS
PS3 PARKS	Ø7JUN94	Ø	1	1	NS
MST2 SIMM	Ø8JUN94	Ø	1	2	S
BM2 DODGE	Ø8JUN94	Ø	1	2	S
PS3 PARKS	Ø8JUN94	Ø	1	2	S
MST2 SIMM	13JUN94	Ø	1	2	S
BM2 DODGE	13JUN94	Ø	1	2	S
MST2 SIMM	22JUN94	Ø	1	2	S
BM2 DODGE	22JUN94	Ø	1	2	S
MST2 SIMM	29JUN94	Ø	1	2	S
BM2 DODGE	Ø7JUL94	Ø	1	2	S
MST2 SIMM	Ø7JULY94	Ø	1	2	S

SYLVAN SLOUGH MAN/BOAT HOURS

NAME	DATE	BOAT HRS.	VEHICLE HRS.	TOTAL HRS.
TO ~~CASM2 SIM~~				
BM2 DODGE	Ø2 AUG 94	Ø	1	1 NS
MST2 SIMM	23 AUG 94	Ø	1	1 NS
BM2 DODGE	23 AUG 94	Ø	1	1 NS
MST2 SIMM	13 SEP94	Ø	1	1 NS
MK1 GRGIC	13 SEP94	Ø	1	1 NS
MST2 SIMM	22SEP94	Ø	1	1 NS
BM2 DODGE	22 SEP94	Ø	1	1 NS
MK1 GRGIC	Ø3OCT94	Ø	1	1 NS
BM2 DODGE	Ø3OCT94	Ø	1	1 NS
MST2 SIMM	Ø7OCT94	Ø	1	1 SHEEN
BM2 DODGE	Ø7OCT94	Ø	1	1 SHEEN
MST2 SIMM	18 OCT 94	Ø	1	1 NS
BM2 DODGE	18 OCT 94	Ø	1	1 NS
MK1 GRGIC	Ø7 NOV94	Ø	1	1 NS
BM2 DODGE	Ø7NOV94	Ø	1	1 NS
MK1 Grgic	05 Dec 94	Ø	1	1 NS
MST2 Simm	05 Dec 94	Ø	1	1 NS
MK1 Grgic	14 Dec 94	Ø	1	1 NS
MK1 Grgic	15 Feb 95	Ø	1	1 ice NS
MST2 Simm	15 Feb 95	Ø	1	1 ice NS
MST2 Simm	21 FEB95	Ø	1	1 SHEEN
MST2 [illegible]	21 FEB 95	Ø	1	1 SHEEN
MK1	21 MAR 95	Ø	1.	1. NS
MST2 [illegible]	11 APR 95	Ø	1.0	1.Ø N.S.

SYLVAN SLOUGH MAN/BOAT HOURS

NAME	DATE	BOAT HRS.	VEHICLE HRS.	TOTAL HRS.	
MST2 Simm	18 MAY 95	Ø	1	1	NS
MST3 PEDRICK	18 MAY 95	Ø	1	1	NS
BM2 DODGE	23 MAY 95	Ø	1	1	S
MST3 PEDRICK	23 MAY 95	Ø	1	1	S
MST2 Simmerman	07 June 95	Ø	1	1	NS
MST3 Pedrick	07 Jun 95	Ø	1	1	NS
BM2 DODGE	14 JUN 95	1	Ø	1	NS
MST3 PEDRICK	14 JUN 95	1	Ø	1	NS
MK1 Grgic	26 JUN 95	0	1	1	NS
MST2 Sim	26 JUN 95	0	1	1	NS
PS1 Pegis	17 Jul 95	0	1	3	
PS2 Jacobson	24 JUL 95	0	1	4	
MST2 Simm	07 AUG 95	Ø	1	1	NS
BM2 Dodge	07 AUG 95	Ø	1	1	NS
MST2 Simm	09 AUG 95	Ø	1	1	S
BM2 DODGE	09 AUG 95	Ø	1	1	S
BM2 DODGE	15 AUG 95	Ø	1	1	S
MST2 SIMMERMAN	05 SEP 95	Ø	1	1	NS
BM2 DODGE	05 SEP 95	Ø	1	1	NS
MST3 Pedrick	01 NOV 95	Ø	1	1	NS
MST2 Simmerman	01 NOV 95	Ø	1	1	NS
MST3 Pedrick	09 Jan 96	Ø	1	1	NS
MST3 Reed	09 Jan 96	Ø	1	1	NS
MK1 GRGIC	29 FEB 96	Ø	1	1	NS
BM2 DODGE	29 FEB 96	Ø	1	1	NS

SYLVAN SLOUGH MAN/BOAT HOURS

NAME	DATE	BOAT HRS.	VEHICLE HRS.	TOTAL HRS.	
BM2 DODGE	8 MAR 96	Ø	1	1	S
PS1 MITTERSDORF	13 MAR 96	Ø	1	1	S
Pedrick	27 MAR 96	Ø	1	1	
Reed	11	Ø	1	1	
Snowden	17 JUN 96	Ø	1	1	
Reed	17 JUN 96	Ø	1	1	
Grsic	25 Jul 96	Ø	1	1	
Reed	25 Jul 96	Ø	1	1	
Pedrick	13 Aug 96	Ø	1	1	
Retzlaff	11	Ø	1	1	
BM2 DODGE	22 AUG 96	Ø	2	2	S
PS3 WITCO	22 AUG 96	Ø	2	2	S
EM1 REYNA	22 AUG 96	Ø	2	2	S
MK' NST3	22 OCT 96	Ø	1	1	S
BM2 DODGE	18 DEC 96	Ø	1	1	S
MST3 Pedrick	9 Jun 97	Ø	1	1	

OUTFALL MAN/BOAT HOURS

NAME	DATE	BOAT HRS.	VEHICLE HRS.	TOTAL HRS.	
MST3 Pedrick	01NOV95	0	1	1	
MST2 Sunderman	11	0	1	1	
MST3 PEDRICK	09JAN96	0	1	1	
MST3 REED	09JAN96	0	1	1	
MK1 GRGIC	29FEB96	0	1	1	
BM2 DODGE	29FEB96	0	1	1	
BM2 DODGE	13MAR96	0	1	1	S
PS1 WITTELSDORF	13MAR96	0	1	1	S
MST3 Pedrick	27MAR96	–	1	1	
MST3 Reed	27MAR96	–	1	1	

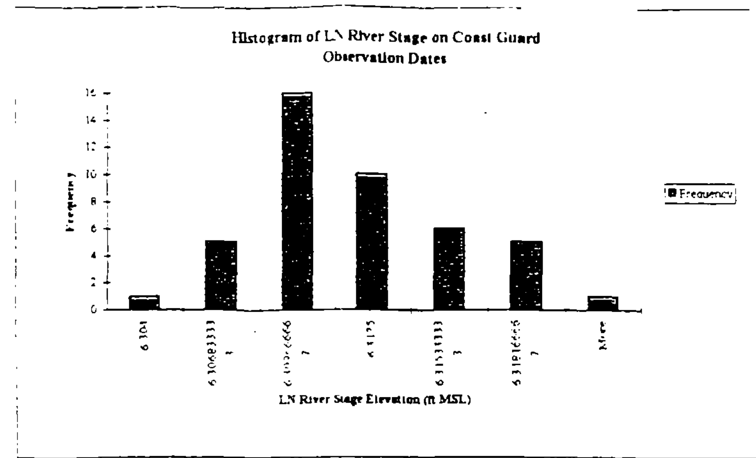
River Stage and Oil Sheen Observations Summary

Coast Guard Observation Date	Observation Result	River Stage Elev MSL	LN River Stage (ft MSL)	Position on Stage Hydrograph
2-May-94	No Sheen	553.52	6.316	Rising
11-May-94	No Sheen	556	6.321	Falling
24-May-94	No Sheen	551.58	6.313	Falling
3-Jun-94	No Sheen	549.56	6.309	Falling
7-Jun-94	No Sheen	549.17	6.308	Rising
8-Jun-94	Sheen	549.4	6.309	Minor Peak
13-Jun-94	Sheen	548.59	6.307	Low
22-Jun-94	Sheen	549.29	6.309	Rising
29-Jun-94	Sheen	550.37	6.311	Falling
7-Jul-94	Sheen	550.8	6.311	Minor Peak
2-Aug-94	No Sheen	549.79	6.31	Falling
23-Aug-94	No Sheen	549.3	6.309	Falling
13-Sep-94	No Sheen	547.19	6.305	Low
22-Sep-94	No Sheen	551.1	6.312	Rising
3-Oct-94	No sheen	551.14	6.312	Falling
7-Oct-94	Sheen	549.9	6.31	Falling
18-Oct-94	No Sheen	549.13	6.308	Low
7-Nov-94	No Sheen	550.44	6.311	Minor Peak
5-Dec-94	No Sheen	549.26	6 309	Falling
14-Dec-94	No Sheen	547.39	6.305	Low
15-Feb-95	No Sheen	547.87	6.306	Steady
21-Feb-95	Sheen	547.44	6.305	Rising
21-Mar-95	No Sheen	551.92	6.313	Rising
11-Apr-95	No Sheen	553.31	6.316	Low
18-May-95	No Sheen	553.94	6.317	Falling
23-May-95	Sheen	553.8	6.317	Low
7-Jun-95	No Sheen	553.09	6.316	Falling
14-Jun-95	No Sheen	551.41	6.312	Falling
26-Jun-95	No Sheen	549.59	6.309	Falling
7-Aug-95	No Sheen	548.9	6.308	Falling
9-Aug-95	Sheen	549.11	6.308	Low
15-Aug-95	Sheen	549.12	6.308	Low
5-Sep-95	No Sheen	551.43	6.313	Rising
1-Nov-95	No Sheen	551.52	6.313	Rising
9-Jan-96	No Sheen	549.3	6.309	Low
29-Feb-96	No Sheen	550.4	6.311	Minor Peak
13-Mar-96	Sheen	549.59	6.309	Falling
27-Mar-96	No Sheen	551.64	6.313	Rising
17-Jun-96	No Sheen	552.4	6.314	Low
25-Jul-96	No Sheen	550.9	6.312	Minor Peak
13-Aug-96	No Sheen	548 43	6.307	Falling
22-Aug-96	Sheen	547.64	6.306	Rising
22-Oct-96	Sheen	546.75	6.304	Low
10-Dec-96	Sheen	549 49	6.309	Steady

Point	LN Stage	Rank	Percent
2	6 321	1	100 00%
25	6 317	2	95.30%
26	6.317	2	95.30%
1	6.316	4	88.30%
24	6 316	4	88.30%
27	6.316	4	88.30%
39	6 314	7	86.00%
3	6.313	8	74.40%
23	6.313	8	74.40%
33	6.313	8	74 40%
34	6.313	8	74.40%
38	6.313	8	74.40%
14	6.312	13	65.10%
15	6.312	13	65.10%
28	6.312	13	65.10%
40	6 312	13	65 10%
9	6.311	17	55.80%
10	6.311	17	55.80%
18	6.311	17	55.80%
36	6 311	17	55.80%
11	6.31	21	51.10%
16	6.31	21	51.10%
4	6 309	23	30.20%
6	6.309	23	30.20%
8	6.309	23	30.20%
12	6 309	23	30.20%
19	6 309	23	30.20%
29	6 309	23	30.20%
35	6.309	23	30.20%
37	6.309	23	30.20%
44	6.309	23	30.20%
5	6.308	32	18.60%
17	6.308	32	18.60%
30	6.308	32	18.60%
31	6.308	32	18.60%
32	6.308	32	18.60%
7	6.307	37	13.90%
41	6 307	37	13.90%
21	6.306	39	9.30%
42	6.306	39	9.30%
13	6 305	41	2.30%
20	6 305	41	2.30%
22	6.305	41	2.30%
43	6.304	44	.00%

LN River Stage Statistics	
Mean	6.3104545
Standard Error	0.0005579
Median	6.3095
Mode	6.309
Standard Deviatic	0.0037008
Sample Variance	1.37E-05
Kurtosis	0.3358838
Skewness	0.6108658
Range	0.017
Minimum	6.304
Maximum	6.321
Sum	277.66
Count	44
Confidence Level	0 0011251

Bin	Frequency
6.304	1
6 306833333	5
6 309666667	16
6.3125	10
6 315333333	6
6 318166667	5
More	1



HYPOTHESIS TESTING RELATIVE TO RIVER STAGE ON DAYS WITH AND WITHOUT AN OIL SHEEN

Sheen	No Sheen	LN Sheen	LN No Sheen
553.8	556	6 317	6.321
550.8	553 94	6.311	6.317
550.37	553.52	6.311	6.316
549.9	553.31	6.31	6.316
549.59	553 09	6.309	6.316
549.49	552 4	6.309	6.314
549.4	551.92	6.309	6.313
549.29	551.64	6.309	6.313
549.12	551.58	6.308	6.313
549.11	551.52	6 308	6.313
548.59	551 43	6.307	6.313
547.64	551.41	6.306	6.312
547 44	551.14	6.305	6.312
546.75	551 1	6.304	6.312
	550.9		6 312
	550 44		6 311
	550 4		6.311
	549 79		6 31
	549.59		6.309
	549 56		6.309
	549.3		6.309
	549.3		6.309
	549.26		6.309
	549 17		6.308
	549 13		6.308
	548.9		6.308
	548 43		6.307
	547.87		6.306
	547 39		6.305
	547.19		6.305

t-Test: Two-Sample Assuming Equal Variances

	LN Sheen	*LN No Sheen*
Mean	6 308785714	6.311233333
Variance	9.87363E-06	1.39092E-05
Observations	14	30
Pooled Variance	1.26601E-05	
Hypothesized Mean	0	
df	42	
t Stat	-2.12531703	
P(T<=t) one-tail	0 01974261	
t Critical one-tail	1.681951289	
P(T<=t) two-tail	0.039485221	
t Critical two-tail	2.018082341	

t-Test: Two-Sample Assuming Unequal Variances

	LN Sheen	*LN No Sheen*
Mean	6.308785714	6.311233333
Variance	9.87363E-06	1.39092E-05
Observations	14	30
Hypothesized Mean	0	
df	30	
t Stat	-2.26389017	
P(T<=t) one-tail	0 015486264	
t Critical one-tail	1 697260359	
P(T<=t) two-tail	0 030972527	
t Critical two-tail	2 042270353	

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
LN Sheen	14	88.323	6.30879	9.9E-06
LN No Sheen	30	189.337	6.31123	1 4E-05

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5.7E-05	1	5.7E-05	4.51697	0.03949	4.07266
Within Groups	0.00053	42	1.3E-05			
Total	0.00059	43				

APPENDIX B

INTEGRATED CPT/ROST REPORT

GERAGHTY & MILLER, INC.

SYLVAN SLOUGH
ROCK ISLAND, ILLINOIS

RAPID OPTICAL SCREENING TOOL AND CONE PENETROMETER TEST SUMMARY REPORT

JANUARY 1996

(Project No. HA73)

LORAL

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35 East Wacker Drive, Suite 1000
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During the four and a half day project G&M personnel identified 37 ROST/CPT tests at 29 grid locations. The 8 extra ROST/CPT test at the selected grid locations were due to shallow CPT refusal. A total of approximately 882 linear feet of ROST/CPT testing was completed. The ROST/CPT data is summarized in Table 1. Additionally, 10 soil samples were collected, homogenized, split, and then analyzed ex-situ for fluorescence. Split samples were submitted by G&M personnel for laboratory analysis by EPA Method 418.1. Results of the ex-situ analyses are summarized in Table 2.

2.0 DESCRIPTION OF TECHNOLOGY

The cone penetrometer test is a proven method for rapidly evaluating the physical characteristics of unconsolidated subsurface materials. It is based on the resistance to penetration of an electronically-instrumented cone which is continuously advanced into the subsurface. In accordance with ASTM Standard D3441, the cone is typically advanced at a rate of two centimeters per second with the driving force provided by hydraulic rams that can usually generate twenty tons of force. For specialized applications, CPT delivery systems capable of producing more or less force are available.

The CPT cone used at this site had an apex angle of 60 degrees with a base area of 15 square centimeters (cm^2), and friction sleeve with a surface area of 200 cm^2. The standard geotechnical sensors within the cone measure tip resistance and sleeve friction in tons per square foot (TSF). The combined data from the tip resistance and sleeve friction form the basis of the soil classification (e.g., sand, silt, clay, etc.).

ROST greatly expands the utility of CPT by simultaneously providing information concerning the distribution of PHCs, specifically aromatic petroleum hydrocarbons, with the geotechnical characterization. The ROST employs laser-induced fluorescence spectroscopy for in-situ analysis of PHCs in saturated as well as unsaturated subsurface conditions. Pulsed laser light used for excitation travels via fiber optic cable to a specialized sub-unit attached to the standard CPT cone. The light is directed through a sapphire window in the side of the

GERAGHTY & MILLER, INC.

SYLVAN SLOUGH

ROCK ISLAND, ILLINOIS

RAPID OPTICAL

SCREENING TOOL

AND

CONE PENETROMETER TEST

SUMMARY REPORT

1.0 INTRODUCTION

On December 11 to 15, 1995, Loral provided Geraghty & Miller, Inc. (G&M) of Chicago, Illinois with subsurface characterization services at the Sylvan Slough located in Rock Island, Illinois. The objective of this investigation was to characterize the soil stratigraphy, provide a rapid assessment of the PHC distribution within the subsurface, correlate the fluorescence data with laboratory analytical results, and determine probable location of free phase PHCs. Loral was contracted by G&M to use the Rapid Optical Screening Tool (**ROST**)[1] to evaluate subsurface areas located at the above referenced site for the presence of aromatic petroleum hydrocarbons (PHCs).

The ROST unit (System No. 2), a laser-induced fluorescence (LIF) tool, was delivered through standard Cone Penetrometer Test (CPT) methods from a 20 ton truck-mounted CPT rig. CPT services for the project were provided by Stratigraphics of Glen Ellyn, Illinois. All field work and project planning was supervised by personnel from G&M.

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[1] Rapid Optical Screening Tool is a registered Trademark of Loral Corporation and is hereafter referred to as ROST.

GERAGHTY & MILLER, INC.

SYLVAN SLOUGH
ROCK ISLAND, ILLINOIS

RAPID OPTICAL SCREENING TOOL AND CONE PENETROMETER TEST SUMMARY REPORT

Table of Contents

sub-unit and onto the surface of the soil. Aromatic petroleum hydrocarbons present within the soil absorb the excitation light and emit the absorbed energy as fluorescence. A portion of this fluorescence is returned by a collection fiber to the surface and is analyzed by the ROST unit for both spectral (wavelength) and temporal (time-resolved) information.

The ROST laser pulses excitation light at 50 pulses per second, and then averages the information to a single data point with a digital oscilloscope. The wavelength of the pulsed excitation light is tunable and can be set to wavelengths of 266 nanometers (nm) or to wavelengths between 280 and 300 nm. The wavelength of the excitation light used for each test during this project is listed on the individual Integrated ROST/CPT Data Logs in Appendix A.

The fluorescence intensity of a reference solution placed on the sapphire window is measured immediately prior to conducting each test. This reference solution measurement serves two main purposes. First, as a quality control check, the solution is used to ensure that the performance of the system is within specifications. Second, it allows for normalization of the data from different test locations for variation in laser power, operating conditions, and monitored emission wavelength. The reference solution used for this project was the standard M1 reference, which is a proprietary PHC containing solution, developed by Loral. M1 provides consistent fluorescence response across the portion of the spectrum analyzed by ROST and therefore, allows the fluorescence data collected to be consistently normalized to intensities recorded as a percentage of M1.

During ROST testing, the fluorescence emission is monitored at an operator selected wavelength, which is recorded on the individual Integrated ROST/CPT Data Logs. The fluorescence versus depth (FVD) log, found on the left side of the integrated data logs, is developed from the gathered emission and provides the basis for determining the distribution of PHCs as a function of depth below ground surface. The intensity of the fluorescence (in percent) is displayed as a continuous graph over the entire depth of the ROST/CPT hole.

The fluorescence intensity value is a sum of two components, background signal and fluorescence response. The background signal is composed of several components including fluorescence from the sapphire window, laser scatter, and electrical noise. The background can be measured directly by the signal returned from uncontaminated soil, or in the case of an FVD, a histogram of the signal in the background region can be plotted. In the later case, the arithmetic mean of the noise in this region represents the background. Once the background has been established it is subtracted from the fluorescence signal. The standard deviation of the noise in the background is used to establish a confidence interval, for this project a confidence interval of 99 % was used. Readings above the confidence interval are statistically significant. The readings above the confidence interval are referred to as being above the limit of detection (LOD). The noise is still in the measurements, and the LOD is used to judge the point at which PHCs are reliably detected.

In addition to the FVD information, ROST can be used to qualitatively differentiate PHC product types according to variations in their wavelength-time matrices (WTMs). The WTMs, recorded during short pauses (approximately two minutes) in the CPT test, are a series of averaged fluorescence intensity versus time profiles over a range of fluorescence wavelengths, typically 300 to 500 nm, in 10 nm intervals. Because the WTMs can be used to distinguish the spectroscopic signatures of PHC product types, they are especially useful for defining separate plumes when multiple sources of contamination are present. General data interpretation information for both FVDs and WTMs are found in Attachment 1.

3.0 RESULTS

One of the objectives of this project was to relate in-situ fluorescence data to conventional total petroleum hydrocarbons (TPH) concentrations in mg/kg. In order to accomplish this objective, ex-situ ROST testing was conducted on 10 soil samples collected from 9 different grid locations. Upon retrieval, each of the soil samples was immediately homogenized by through mixing in a stainless steel bowl. A portion of the sample was used for ex-situ ROST testing and the remainder was placed into sample jars, sealed, and labeled.

G&M personnel maintained these samples and submitted them to a laboratory for TPH analysis by EPA method 418.1. Ex-situ ROST testing consisted of collecting five or six WTMs of the sample. The WTMs were run on different grab samples from the homogenized split. A WTM of each of the samples is attached in Appendix B.

To correlate the data, the average fluorescence intensity of the samples was plotted versus the concentration obtained from the portion submitted for TPH analysis. A linear regression of the data was done and a poor correlation was found ($r^2 = 0.08$). Review of the data indicated the result for sample from CPT-28 at 23 to 24 feet appeared anomalous. The sample was reanalyzed by both the ROST system and the analytical laboratory with results of 17.1 % and 15,000 mg/kg, respectively. These results indicate good repeatability considering the time between acquisition of the first and second set of readings, 2 to 3 weeks. A linear regression of the data excluding the CPT-28 sample was done and a good correlation was found ($r^2 = 0.74$). Possible reasons for the poor correlation between methods from the sample from CPT-28 include: poor homogenization, large variation in PHC concentration over the sample interval adding to poor homogenization, dilution of laboratory sample, and results outside the linear range for analytical test method.

The in-situ data collected by ROST indicates the presence of PHC containing soils within subsurface areas of the site. Through statistical analyses, a correlation between the FVD data and laboratory total petroleum hydrocarbons (TPH) concentrations has been developed and used to convert fluorescence data on the Integrated ROST/CPT Data Logs to equivalent TPH concentrations. The presence of PHCs are indicated by elevated equivalent TPH concentrations on the Integrated ROST/CPT Data Logs which are attached in Appendix A. Based on analysis of the in-situ FVD data, equivalent TPH concentrations greater than the LOD indicate the presence of PHCs. All of the 37 tests showed elevated equivalent TPH concentrations, except CP025A, which met refusal at a final window depth of 2.1 ft. Only 6 grid locations (CP005, CP011, CP012, CP016, CP017, and CP018) had maximum elevated equivalent TPH concentrations of less than 5,000 mg/kg.

The types of PHC products encountered can be qualitatively identified from the spectroscopic signatures on the WTM plots which are also found in the integrated logs in Appendix A. One of the fifty-four WTMs, WCP030A, indicates background. The remaining WTMs generally appear to be a diesel-like PHC. Differences in WTMs may be due to increased weathering of the PHCs, degradation of the lighter molecular weight portion of the PHCs, or variations in soil oxygen content. It was generally noted that WTMs collected near the surface had shorter lifetimes, possibly indicating more weathering or degradation of the PHCs. Data interpretation information for both the FVDs and WTMs is found in Attachment 1.

CPT data was only provided for the deepest hole at each grid location. The CPT data indicate that soil lithology encountered consists of multiple layers of unconsolidated sands, silts, and clays. CPT data from most of the test locations indicate a 6-inch to 2-foot thick layer of clay or silt and clay at a depth of 10 to 20 feet. The interbedded nature of the layers can be seen on the coded soil logs which are part of the Integrated ROST/CPT Data Log.

Discussions with personnel from G&M indicated their interest in placing wells at the site for the purpose of a pilot test for the recovery of free phase product in a confined aquifer located at the site. The confined aquifer is located below a clay layer at a depth of approximately 20 feet. Review of the Integrated ROST/CPT Data Logs and correlation results suggest several locations of potential free phase PHCs located in the lower confined aquifer. Integrated ROST/CPT Data Logs from CP002, CP006, and CP007B indicate high fluorescence readings; 232 %, 316 %, and 396 %, respectively. These high readings are located directly below the interface between low and higher permeability soils. This is consistent with what would be expected for light non-aqueous phase liquids (LNAPLs) in a confined aquifer. Wells installed at other test locations may also produce recoverable amounts of free phase PHC.

4.0 METHODS AND PROCEDURES

Loral incorporates standard operating procedures, performs services in accordance with applicable health and safety standards, and follows site specific protocols to address decontamination and hole abandonment procedures. The following section summarizes our methods and procedures.

4.1 Equipment Decontamination

Decontamination of all down hole equipment consisted of drawing the CPT rods through a rubber "O" ring wiper assembly and steam cleaning chamber which are located beneath the CPT vehicle. Due to the location of the "O" ring and steam cleaning assemblies, all equipment was thoroughly decontaminated before it entered the operations area of the CPT vehicle.

4.2 Health and Safety

All work was performed in accordance with Loral (ROST Program) health and safety policy as well as with the site specific health and safety plan. In accordance with Level D personal protection, all Loral personnel wore steel-toed shoes, hard hats, and safety glasses while on site.

4.3 Hole Abandonment

All test hole abandonment procedures were conducted by Stratigraphics. Abandonment consisted of grouting the small diameter holes with a bentonite slurry mixture. In order to assure a proper seal, the grout was continuously placed until it over-topped at the surface of the test holes.

5.0 LIMITATIONS OF ENVIRONMENTAL SUBSURFACE WORK

Loral's report is based upon Loral's observations made during field work, the information provided to Loral and the results of the ROST/CPT survey. Given the inherent limitation of environment subsurface work, Loral can not guarantee that the site is free of hazardous or potentially hazardous materials or conditions or that latent or undiscovered conditions will not become evident in the future. Loral's report was prepared in accordance with the Workplan and the General Conditions agreed to between Loral and Client and no warranties, representations, or certifications are made.

Prepared by: Benjamin J. Timerson

Benjamin J. Timerson, P.E.
Project Manager

Reviewed by: David Bohne for

Kevin D. Krueger, P.E.
Director of Environmental Services

TABLE 1

ROST DATA SUMMARY

TABLE 1

ROST DATA SUMMARY

GERAGHTY & MILLER, INC.

SYLVAN SLOUGH
ROCK ISLAND, ILLINOIS

ROST Location Identification	Date	Maximum TPH Concentration (mg/kg)	Depth of Maximum TPH Concentration (ft.)	Number of WTMs Collected	Total Depth (ft.)	Comments
CP001	12/12/95	6,100	17.5	2	34.3	WTMs collected at 6.0 and 15.4 ft. Significant fluorescence noted from the surface to approx. 2, 2.5 to 4, 6 to 8.5, and 15 to the bottom of the hole at 33.7 ft.
CP002	12/13/95	10,500	22.5	2	29.0	WTMs collected at 10.8 and 20.5 ft. Significant fluorescence noted from the surface to approx. 1, 5.5 to 7, at 8, 9.5 to 12.5, and 17 to the bottom of the hole at 27.5 ft.
CP003	12/13/95	7,390	15.3	2	32.0	WTMs collected at 11.9 and 26.9 ft. Significant fluorescence noted from approx. 0.5 to 3.5, 9 to 20, and 20.5 to the bottom of the hole at 30.9 ft.
CP004	12/13/95	12,700	18.4	2	28.3	WTMs collected at 9.3 and 15.9 ft. Significant fluorescence noted from the surface to approx. 5, 7.5 to 10, 10.5 to 13, and 14 to the bottom of the hole at 27.2 ft.
CP005	12/13/95	560	13.1	1	28.3	WTM collected at 13.3 ft. Significant fluorescence noted from the surface to approx. 2, 4 to 5.5, 10.5 to 11.5, 12 to 14, and 20 to the bottom of the hole at 27.2 ft.
CP006	12/11/95	14,400	23.0	3	33.4	WTMs collected at 8.9, 19.7, and 22.6 ft. Significant fluorescence noted from the surface to approx. 1.5, 9 to 13, 15 to 18, 19 to 27.5, and 28 to 29.5 ft.
CP007	12/11/95	47	0.5	0	10.0	No WTMs collected. Significant fluorescence noted from the surface to approx. 3 ft.
CP007A	12/11/95	51	0.4	0	10.8	No WTMs collected. Significant fluorescence noted from the surface to approx. 2 ft.
CP007B	12/14/95	18,000	21.8	2	28.1	WTMs collected at 11.0 and 20.0 ft. Significant fluorescence noted from the surface to approx. 1, 9 to 15, and 15.5 to the bottom of the hole at 27.2 ft.
CP008	12/12/95	5,430	25.9	2	33.8	WTMs collected at 21.5 and 26.0 ft. Significant fluorescence noted from the surface to approx. 0.5, at 9.8, and from 19.5 to the bottom of the hole at 32.2 ft.
CP009	12/13/95	13,300	11.3	2	31.0	WTMs collected at 9.2 and 24.7 ft. Significant fluorescence noted from the surface to approx. 0.5 and 7.5 to 27.5 ft.
CP010	12/12/95	14,800	15.6	3	33.0	WTMs collected at 7.8, 15.6, and 23.3 ft. Significant fluorescence noted from the surface to approx. 26.5 and 29 to 30 ft.
			TOTAL	21	332.0	

TABLE 1
(CONTINUED)

ROST DATA SUMMARY

GERAGHTY & MILLER, INC.

SYLVAN SLOUGH
ROCK ISLAND, ILLINOIS

ROST Location Identification	Date	Maximum TPH Concentration (mg/kg)	Depth of Maximum TPH Concentration (ft.)	Number of WTMs Collected	Total Depth (ft.)	Comments
CP011	12/13/95	2,940	16.5	3	31.7	WTMs collected at 12.4, 15.7, and 21.2 ft. Significant fluorescence noted from the surface to approx. 1, at 8.5, 11 to 26.5, 27.5 to 28.5, and 29 to 30 ft.
CP012	12/12/95	120	14.4	1	20.6	WTM collected at 14.5 ft. Significant fluorescence noted from the surface to approx. 0.5, 3 to 4, 6.5 to 8, and 14.5 to 15 ft.
CP012A	12/12/95	1,690	21.3	1	28.0	WTM collected at 20.0 ft. Significant fluorescence noted from approx. 3 to 5, 14.5 to 15.5, and 19.5 to 23 ft.
CP013A	12/12/95	53	0.2	0	1.9	No WTMs collected. Significant fluorescence noted at approx. 0.2 ft.
CP013B	12/12/95	31	0.2	0	2.2	No WTMs collected. Significant fluorescence noted at approx. 0.2 ft.
CP013C	12/14/95	10,400	14.7	2	26.5	WTMs collected at 3.3 and 10.8 ft. Significant fluorescence noted from the surface to approx. 0.5 and 2.5 to the bottom of the hole at 25.4 ft.
CP014	12/12/95	8,900	18.6	1	28.3	WTM collected at 10.3 ft. Significant fluorescence noted from the surface to approx. 0.5, 6.5 to 7, and 9.5 to the bottom of the hole at 27.4 ft.
CP015	12/12/95	8,740	15.8	1	29.2	WTM collected at 10.7 ft. Significant fluorescence noted from the surface to approx. 1 and 10 to the bottom of the hole at 28.6 ft.
CP016	12/12/95	2,710	17.5	3	26.2	WTMs collected at 12.4, 17.4, and 24.8 ft. Significant fluorescence noted from the surface to approx. 1, at 2, 10.5 to 13.5, and 15 to the bottom of the hole at 24.9 ft.
CP017	12/12/95	2,490	16.8	1	23.5	WTM collected at 15.9 ft. Significant fluorescence noted from the surface to approx. 1.5 and 15.5 to the bottom of the hole at 22.4 ft.
CP018	12/13/95	2,850	14.0	2	23.9	WTMs collected at 12.6 and 22.6 ft. Significant fluorescence noted from approx. 2 to 3.5 and 12 to the bottom of the hole at 22.8 ft.
CP019	12/13/95	11,700	10.3	2	25.2	WTMs collected at 6.7 and 23.0 ft. Significant fluorescence noted from the surface to approx. 1 and 6 to the bottom of the hole at 24.2 ft.
			TOTAL	17	267.2	

TABLE 1
(CONTINUED)

ROST DATA SUMMARY

GERAGHTY & MILLER, INC.

SYLVAN SLOUGH
ROCK ISLAND, ILLINOIS

ROST Location Identification	Date	Maximum TPH Concentration (mg/kg)	Depth of Maximum TPH Concentration (ft.)	Number of WTMs Collected	Total Depth (ft.)	Comments
CP020	12/13/95	11,500	9.5	2	25.9	WTMs collected at 8.0 and 23.0 ft. Significant fluorescence noted from the surface to approx. 0.5 and 5 to the bottom of the hole at 24.5 ft.
CP020A	12/13/95	15,300	14.2	0	25.2	No WTMs collected. Significant fluorescence noted from the surface to approx. 1 and 2.5 to the bottom of the hole at 23.8 ft.
CP021	12/15/95	11,400	13.2	1	26.3	WTM collected at 8.6 ft. Significant fluorescence noted from the surface to approx. 1, 6 to 19.5, and 21 to 23 ft.
CP022	12/15/95	14,000	8.8	1	22.9	WTM collected at 5.3 ft. Significant fluorescence noted from approx. 3.5 to the bottom of the hole at 21.9 ft.
CP023	12/14/95	15,500	10.1	1	20.8	WTM collected at 8.1 ft. Significant fluorescence noted from approx. 4.5 to 5 and 6.5 to the bottom of the hole at 19.7 ft.
CP024	12/15/95	12,400	8.2	1	24.4	WTM collected at 6.7 ft. Significant fluorescence noted from the surface to approx. 19 and 21 to 22.5 ft.
CP025	12/14/95	7,560	10.5	1	13.7	WTM collected at 10.2 ft. Significant fluorescence noted from the surface to approx. 0.5 and 9.5 to 12.6 ft.
CP025A	12/14/95	14	0.3	0	3.5	No WTMs collected. No significant fluorescence noted.
CP028	12/12/95	7,520	23.1	2	35.4	WTMs collected at 3.6 and 22.6 ft. Significant fluorescence noted from the surface to approx. 0.5, at 2.3, 3 to 6, at 10.8, 12 to 14, 16.5 to 17.5, 18.5 to 29, and 31 to 32 ft.
CP029	12/14/95	9,150	20.7	2	21.9	WTMs collected at 14.0 and 20.5 ft. Significant fluorescence noted from the surface to approx. 1.5, 7 to 9, 10.5 to 12, and 13.5 to the bottom of the hole at 20.8 ft.
CP030	12/14/95	12,500	16.7	2	27.7	WTMs collected at 9.1 and 12.4 ft. Significant fluorescence noted from the surface to approx. 0.5, at 1.4, 3.5 to 4.5, at 7, and 11 to the bottom of the hole at 26.7 ft.
CP031	12/14/95	2,670	7.0	1	8.9	WTM collected at 7.1 ft. Significant fluorescence noted from the surface to approx. 1, 1.5 to 2.5, and 6.5 to the bottom of the hole at 7.5 ft.
CP031A	12/14/95	10,100	15.3	2	26.5	WTMs collected at 10.3 and 20.3 ft. Significant fluorescence noted from the surface to approx. 1 and 5 to the bottom of the hole at 25.5 ft.
			TOTAL	16	283.1	

TABLE 2

CORRELATION DATA SUMMARY

TABLE 2

CORRELATION DATA SUMMARY

GERAGHTY & MILLER, INC.

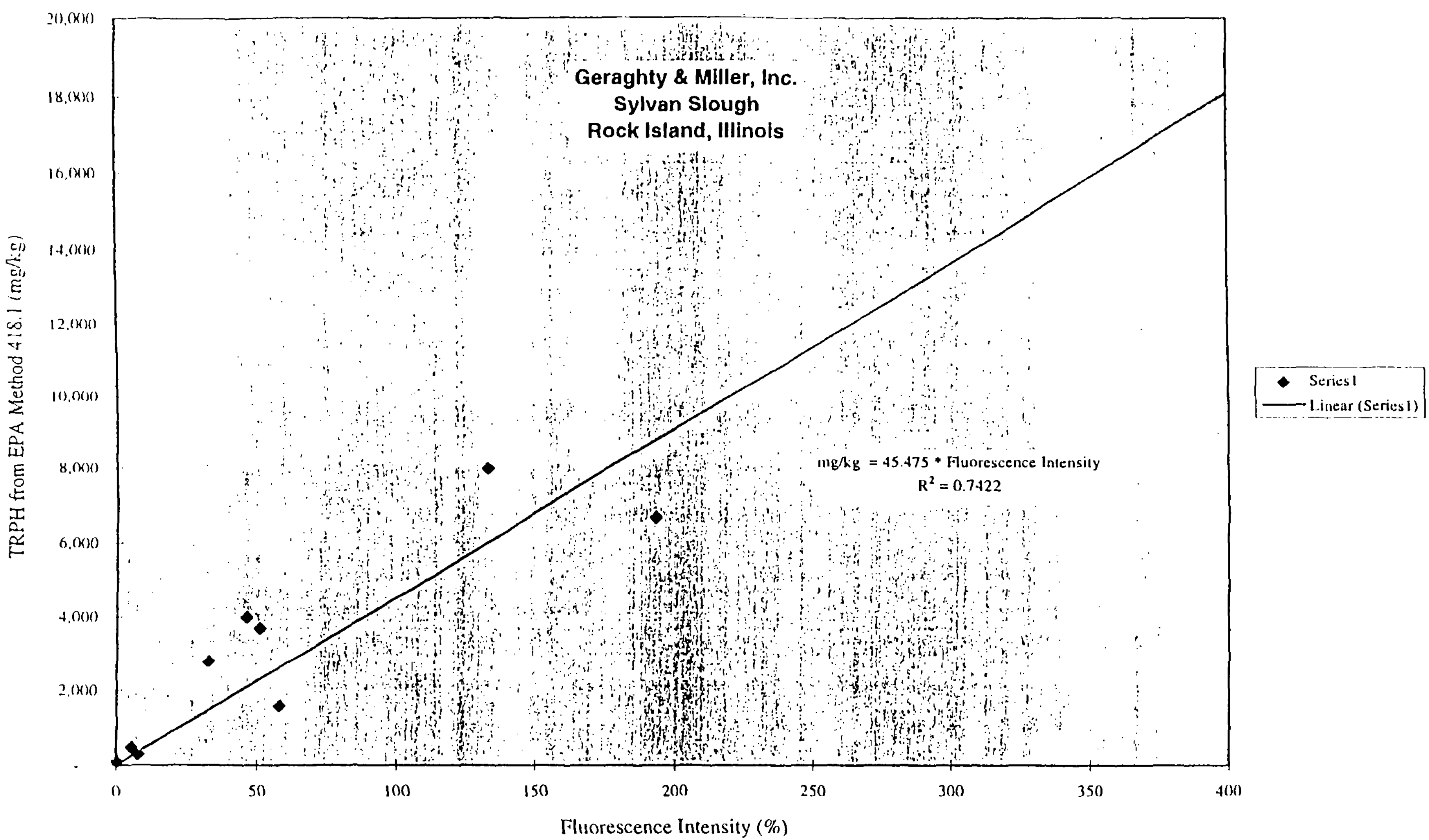
SYLVAN SLOUGH
ROCK ISLAND, ILLINOIS

Sample Location	Depth (ft.)	Average Fluorescence Intensity (%)	TRPH by EPA Method 418.1 (mg/kg)
CPT-6	23-24	32.7	2,800
CPT-7	20-21	5.6	470
CPT-7	21.5-22.5	46.2	4,000
CPT-8	22.5-23.5	0.3	110
CPT-9	23.8-24.8	7.7	290
CPT-10	15.3-16.3	193.1	6,700
CPT-14	18-19	50.9	3,700
CPT-15	17.5-18.5	58.0	1,600
CPT-28	23-24	43.0	14,000
CPT-31	20-21	132.8	8,000

FIGURE 1

EX-SITU FLUORESCENCE INTENSITY VS. TPH CORRELATION

EX-SITU FLUORESCENCE INTENSITY VS. TPH CORRELATION



ATTACHMENT 1

ROST DATA INTERPRETATION

ROST DATA INTERPRETATION

Fluorescence Verses Depth Data

The FVD and CPT data obtained are presented on the Integrated ROST/CPT Data Logs in Appendix A. The FVD data is exhibited as a continuous graph of fluorescence intensity and is presented as a function of depth over the entire length of the ROST/CPT test hole. Depth is recorded along the vertical axis in meters or feet below ground surface (bgs), while the relative fluorescence is recorded along the horizontal axis. Increases in fluorescence intensity are indicated by peaks extending across the horizontal axis of the FVD log. Fluorescence intensities above the background signal indicate the presence of PHC containing substances.

As seen on the integrated logs, coded stratigraphic soil logs allow the stratigraphic position of any relative fluorescence data to be readily determined. The coded logs correspond to the general lithologic soil legend found at the bottom of each log which is based on soil classifications defined by P. K. Robertson and R. G. Campanella.

Wavelength-Time Matrix Data

The WTM plots are also included in Appendix A as part of the Integrated ROST/CPT Data Logs. As many common fuel products exhibit characteristic spectroscopic signatures, qualitative comparisons to site specific WTMs can be made. The WTMs obtained during ROST/CPT testing can be compared to the WTMs of common petroleum products or with WTMs generated from specific material samples recovered from the site. The attached WTM interpretation sheet can be used as guide for making qualitative comparisons. Note that signature patterns on WTMs obtained from zones where only background fluorescence was encountered do not exhibit any distinguishable pattern. Zones of weak fluorescence tend to exhibit slightly erratic signatures and also have indistinguishable patterns.

WAVELENGTH-TIME MATRIX (WTM) INTERPRETATION

Wavelength-Time Matrices (WTMs) are three dimensional representations that relate fluorescence intensity to emission wavelength and to fluorescence decay time following the pulsed excitation. Many common fuel products exhibit characteristic WTM signatures which can be used for qualitative analyses and identification purposes. WTMs obtained during a ROST/CPT test can be compared with WTMs of common petroleum products or with WTMs generated from specific materials recovered from the site.

The wavelength at which the maximum fluorescence intensity occurs (*Peak Signal*) on the WTM is a general indicator of petroleum hydrocarbon (PHC) composition. The fluorescence intensity distribution of aromatic hydrocarbons shifts to longer wavelengths with increasing molecular weight. Lighter PHC products, such as those composed predominantly of lower molecular weight compounds, reach peak fluorescence intensity at relatively shorter wavelengths. In contrast, heavier products composed of larger molecular weight compounds exhibit most of their fluorescence at longer wavelengths.

The Peak Signal recorded at the highest intensity point indicates the maximum relative strength of the fluorescence signal. The fluorescence intensity on a WTM is represented by contour lines or by color coded contour intervals referenced to the amplitude of the peak signal.

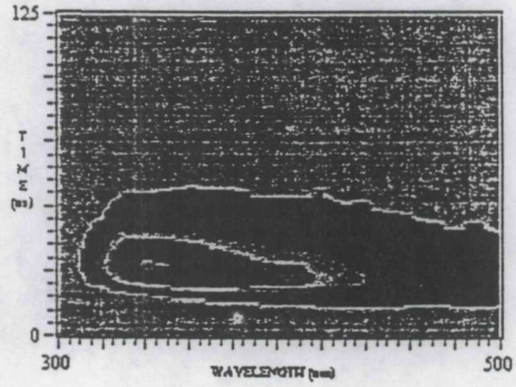
The fluorescence decay time, represented along the vertical axis of the WTM, further aids in defining the PHC type. The WTM signature of *Gasoline* tends to be elongated along the wavelength axis, but with short to moderate extension along the time axis. The *Jet Fuel (JP-4)* WTM has a characteristic compact triangular shape and a long fluorescence decay time. *Diesel Fuel* WTMs are less symmetric than those from gasoline or jet fuel, and tend to have a broad fin pattern along the time axis. *Heavy PHC products such as Coal Tar* have an elliptical shape like gasoline but are shifted to much longer wavelengths.

The shape of the WTM is independent of concentration for a particular petroleum product, but is sensitive to the PHC material composition and to soil oxygen content. The amplitude of the WTM, which is indicated by the peak signal, is proportional to the concentration. The amplitude may be affected by soil matrix and oxygen content.

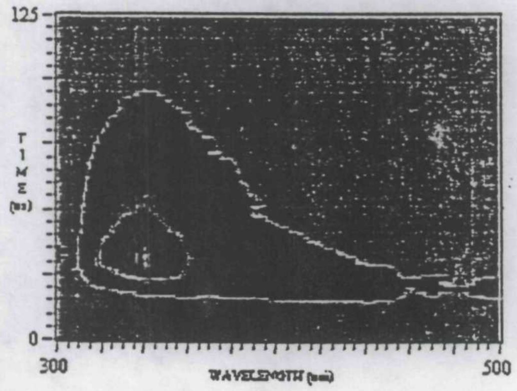
The four WTM plots of common petroleum products presented here are intended to be used only as a guide for qualitative comparison. Should more precise characterization of WTMs be required, additional spectroscopic evaluation of site specific samples can be conducted by Loral.

WTM Signatures of Common Petroleum Products

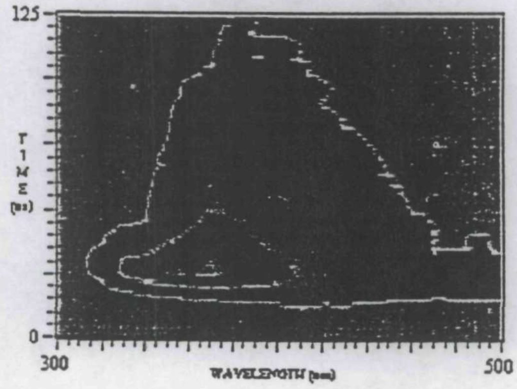
Gasoline **Peak Signal 0.183 @ 340nm**



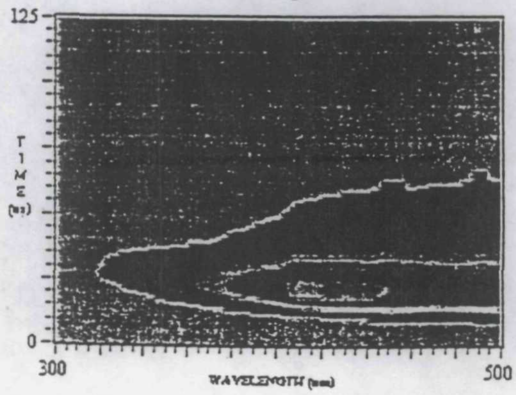
Jet Fuel (JP-4) **Peak Signal 0.176 @ 340nm**



Diesel Fuel **Peak Signal 0.182 @ 370nm**



Coal Tar **Peak Signal 0.127 @ 410nm**



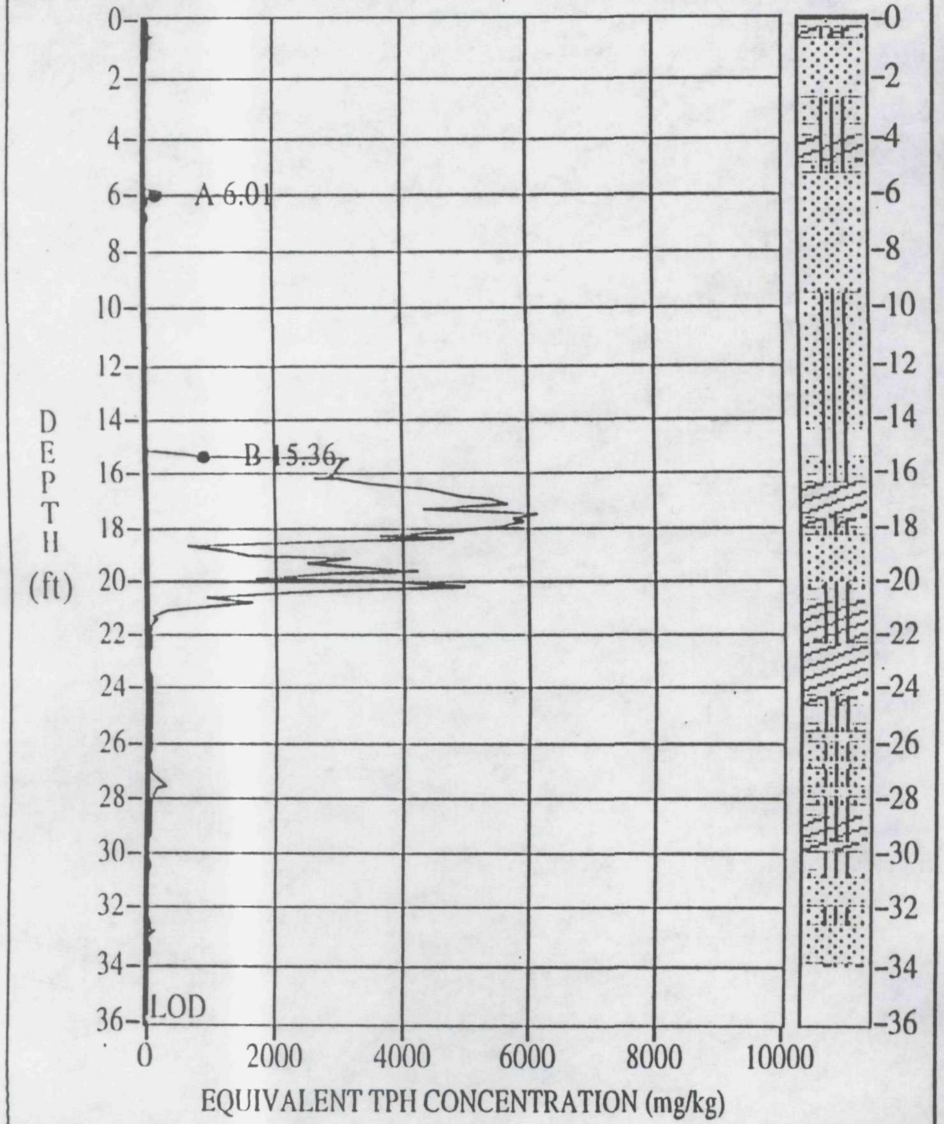
LORAL

APPENDIX A

INTEGRATED ROST/CPT DATA LOGS

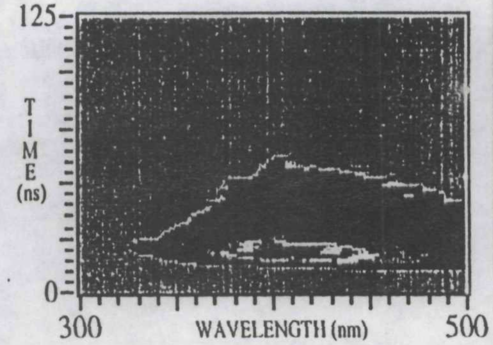
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP001



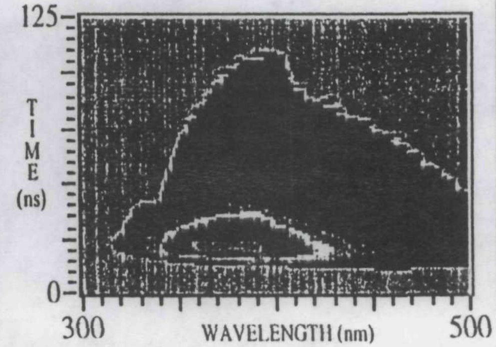
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
6100	17.48	283.00	380.00

A WTM ID : WCP001A



Peak Signal	0.021157 @ 400.00
FVD Signal	0.016687 @ 380.00

B WTM ID : WCP001B



Peak Signal	0.066180 @ 360.00
FVD Signal	0.065734 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/12/95	Geraghty & Miller, Inc.
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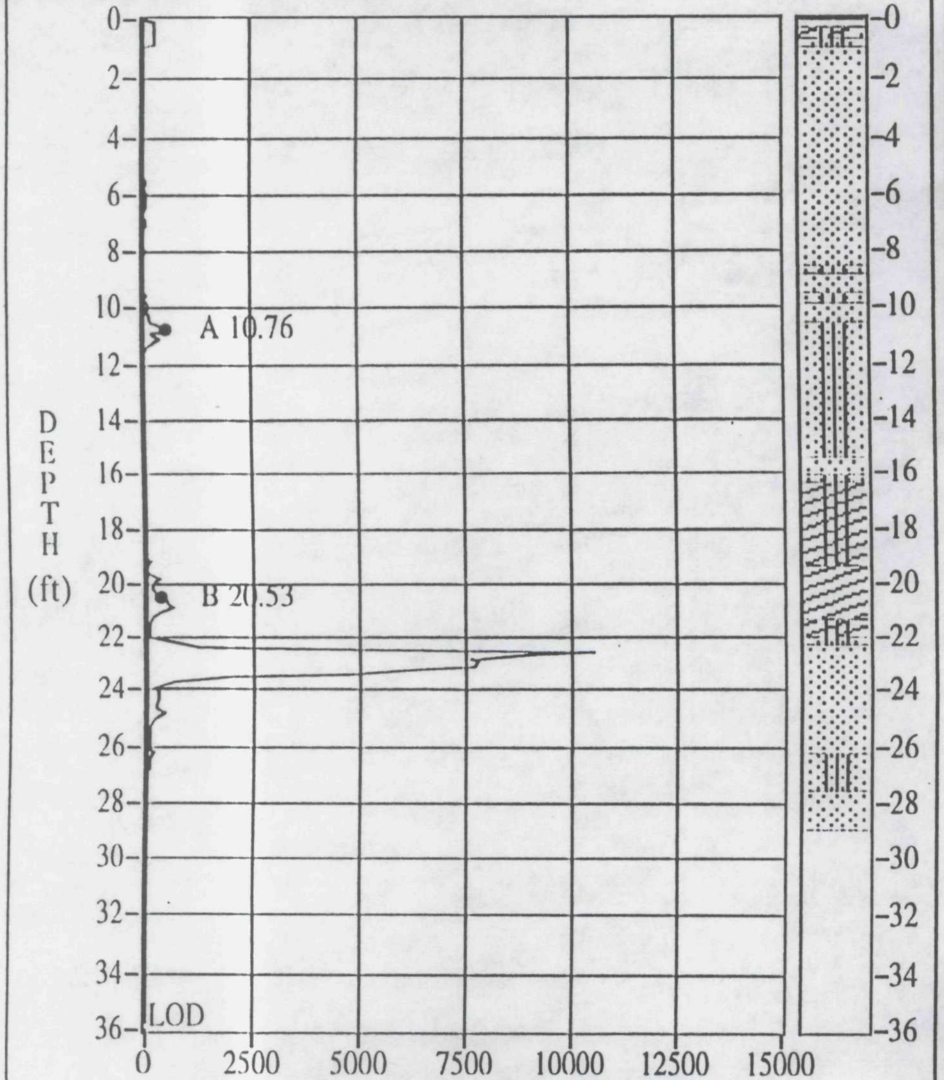
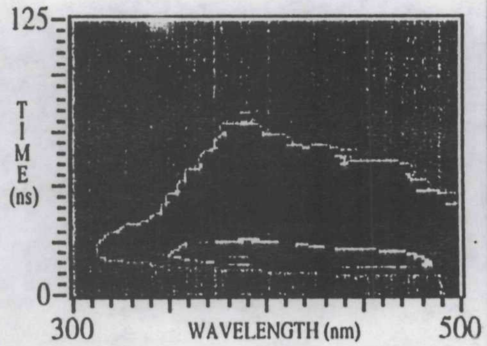
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP002



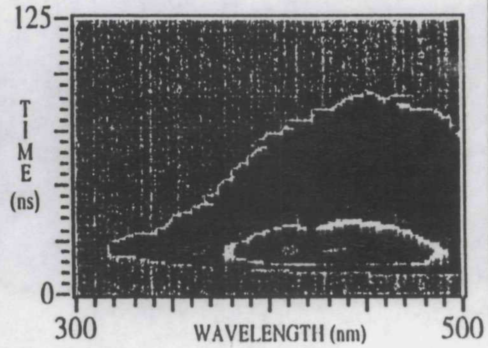
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
10515	22.53	283.00	380.00

A WTM ID : WCP002A



Peak Signal 0.045573 @ 380.00
FVD Signal 0.045573 @ 380.00

B WTM ID : WCP002B



Peak Signal 0.057048 @ 410.00
FVD Signal 0.030745 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

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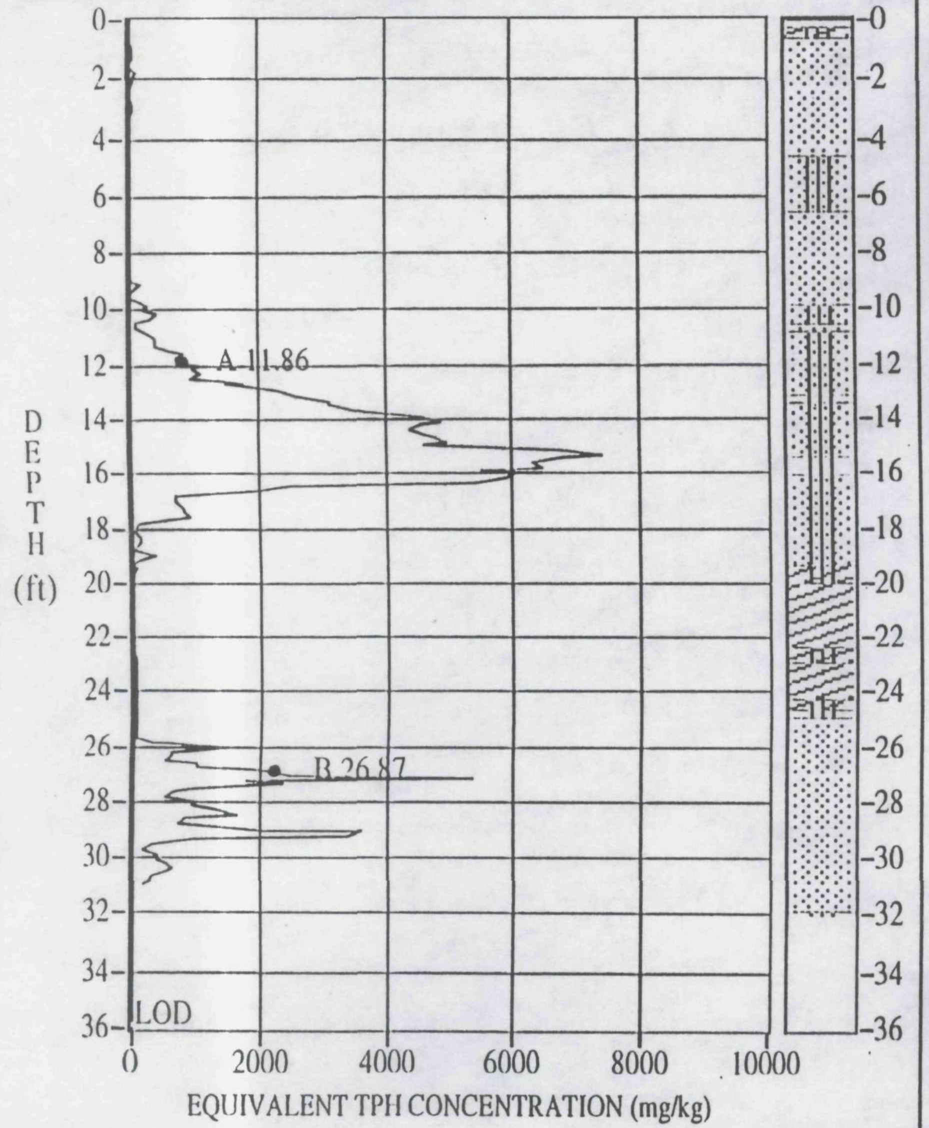
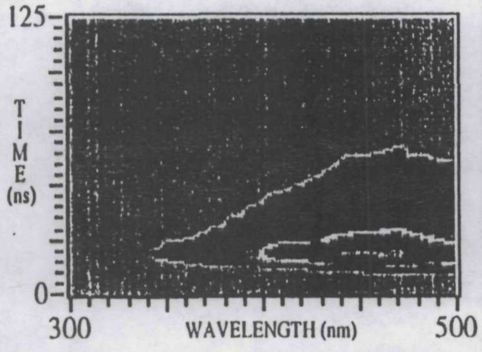
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP003



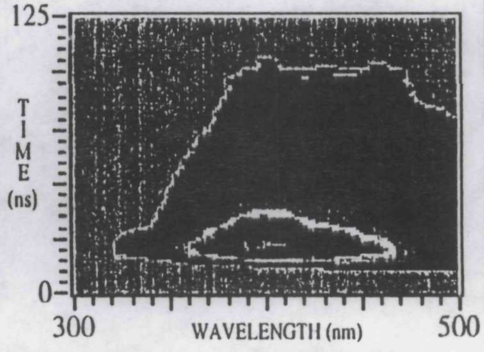
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
7385	15.30	283.00	380.00

A WTM ID : WCP003A



Peak Signal 0.416741 @ 470.00
FVD Signal 0.115586 @ 380.00

B WTM ID : WCP003B



Peak Signal 0.113333 @ 390.00
FVD Signal 0.092329 @ 380.00

Undefined
Peat
Clay
Clay & Silt
Silt
Sand & Silt
Sand

Date: 12/13/95	Geraghty & Miller, Inc.
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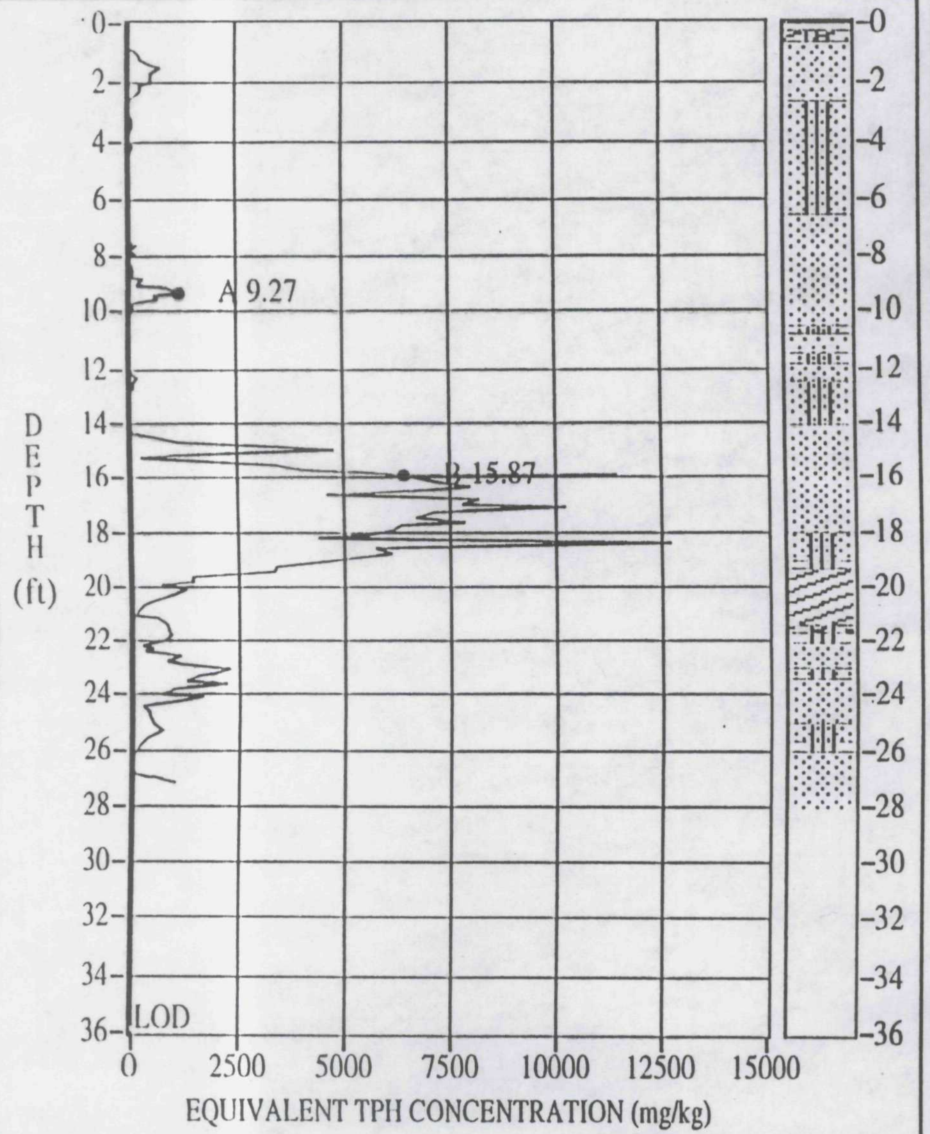
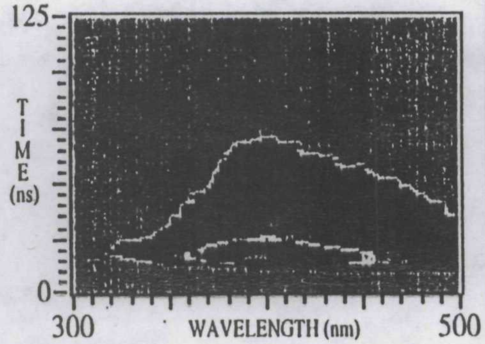
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP004



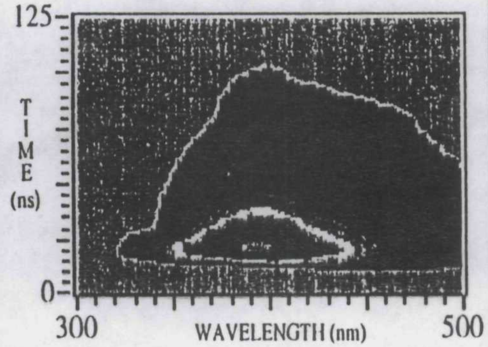
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
12704	18.44	283.00	380.00

A WTM ID : WCP004A



Peak Signal 0.131017 @ 390.00
FVD Signal 0.107403 @ 380.00

B WTM ID : WCP004B



Peak Signal 0.655403 @ 390.00
FVD Signal 0.591383 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/13/95		Geraghty & Miller, Inc.
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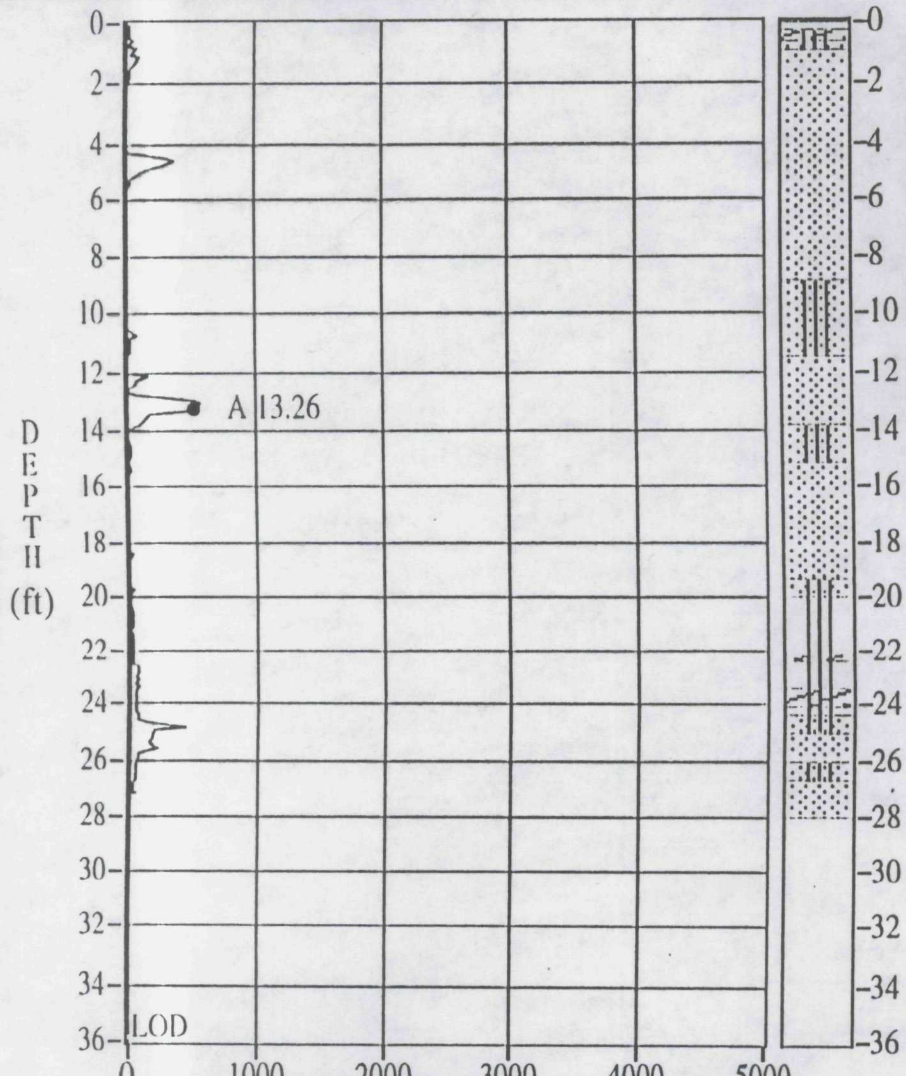
INTEGRATED ROST/CPT DATA LOG

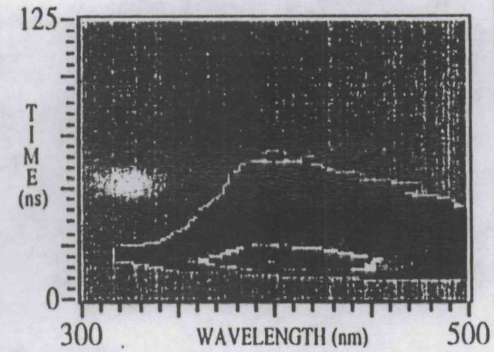
FVD ID : CP005



EQUIVALENT TPH CONCENTRATION (mg/kg)

Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
559	13.08	283.00	380.00

A WTM ID : WCP005A



Peak Signal 0.054578 @ 400.00

FVD Signal 0.038082 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/13/95	Geraghty & Miller, Inc.
Proj. No.: HA73	Sylvan Slough, Rock Island, Illinois
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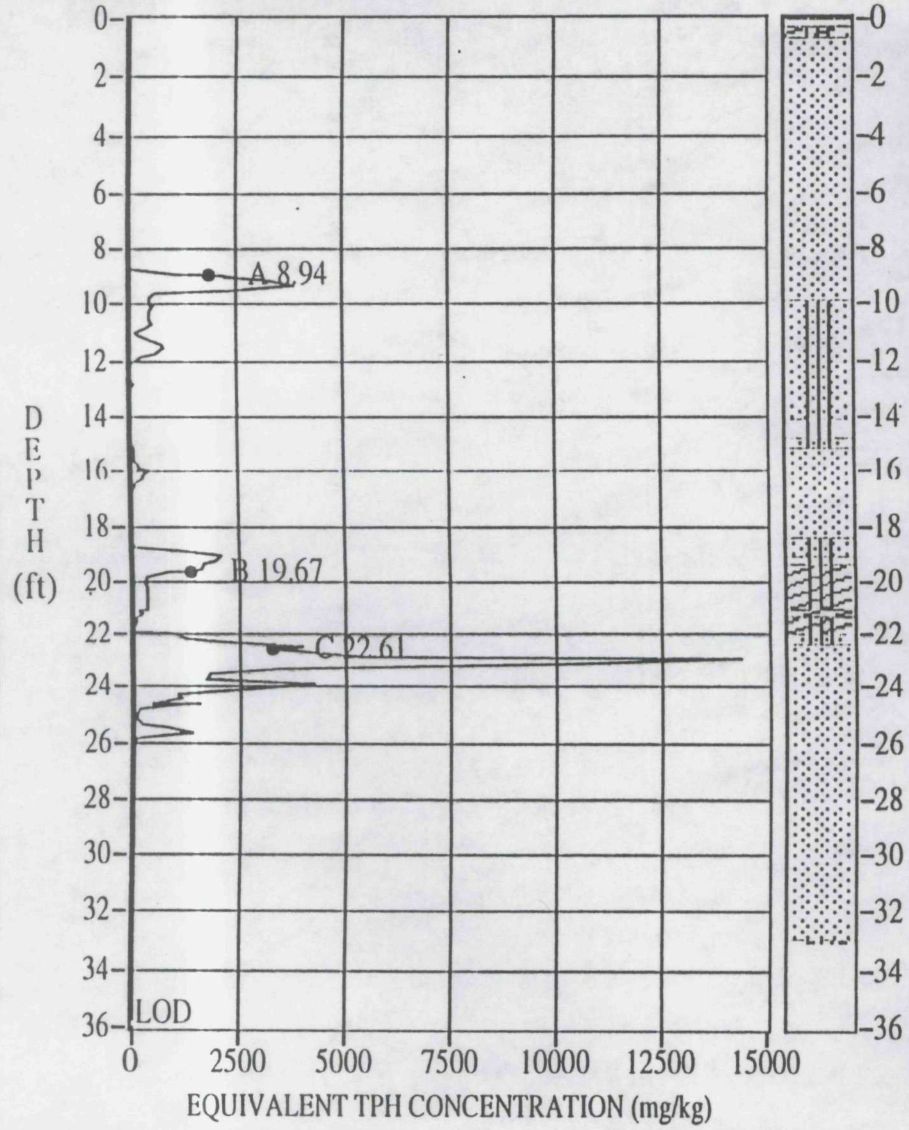
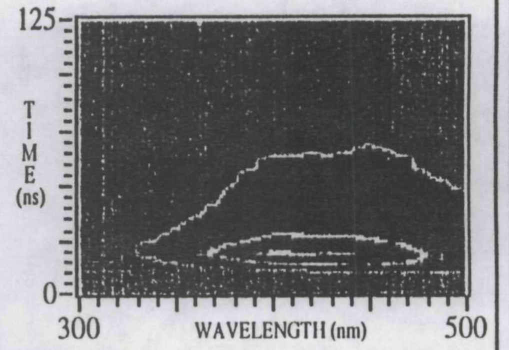
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP006



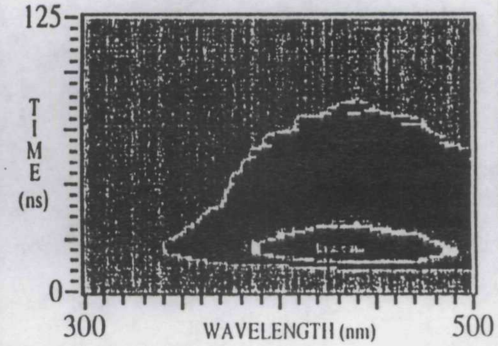
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
14350	22.98	283.00	380.00

A WTM ID : WCP006A



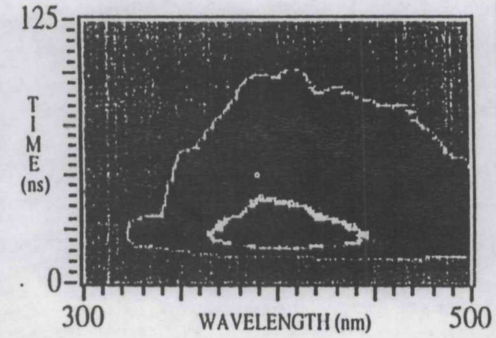
Peak Signal 0.235685 @ 400.00
FVD Signal 0.159542 @ 380.00

B WTM ID : WCP006B



Peak Signal 0.085046 @ 440.00
FVD Signal 0.034252 @ 380.00

C WTM ID : WCP006C



Peak Signal 0.142934 @ 390.00
FVD Signal 0.111317 @ 380.00

Undefined
Peat
Clay
Clay & Silt
Silt
Sand & Silt
Sand

Date: 12/11/95	Geraghty & Miller, Inc.
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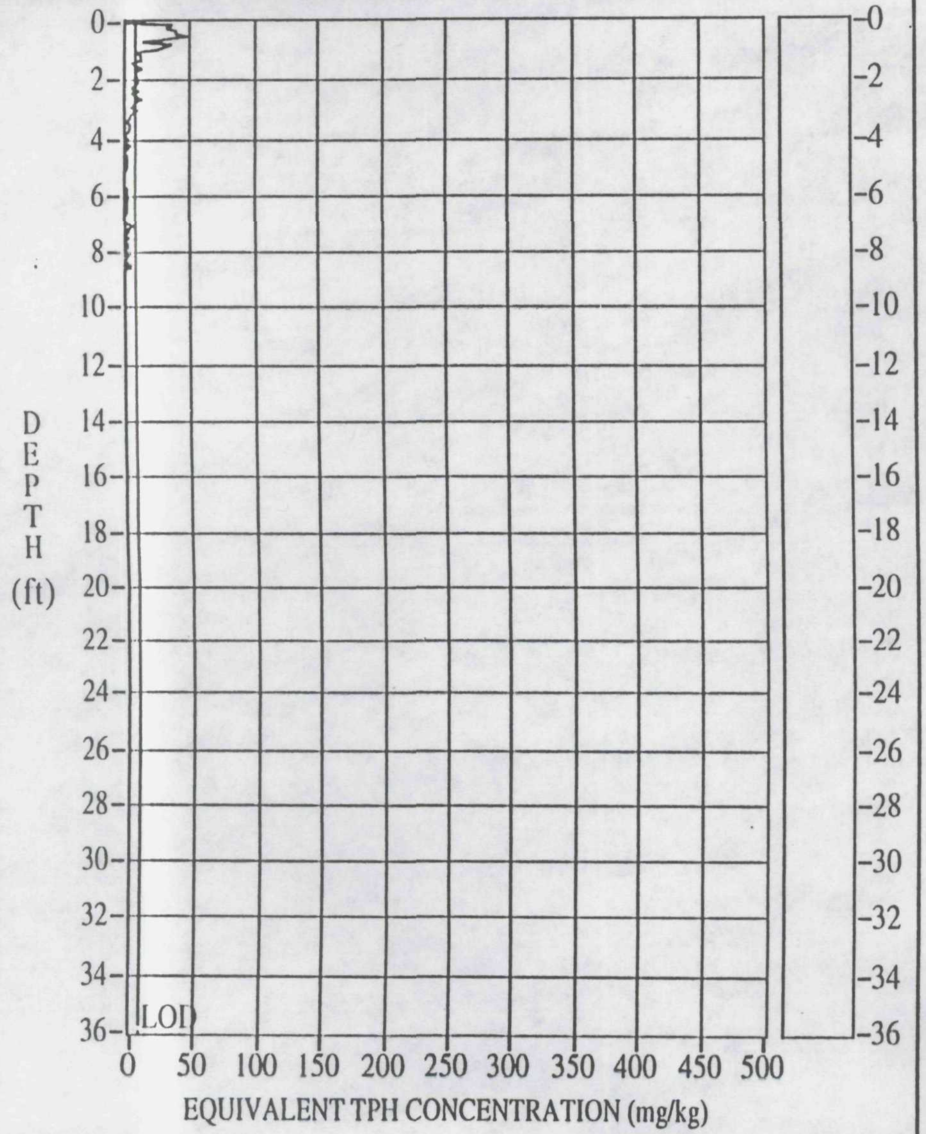
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP007



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
47	0.51	283.00	380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/11/95	Geraghty & Miller, Inc.
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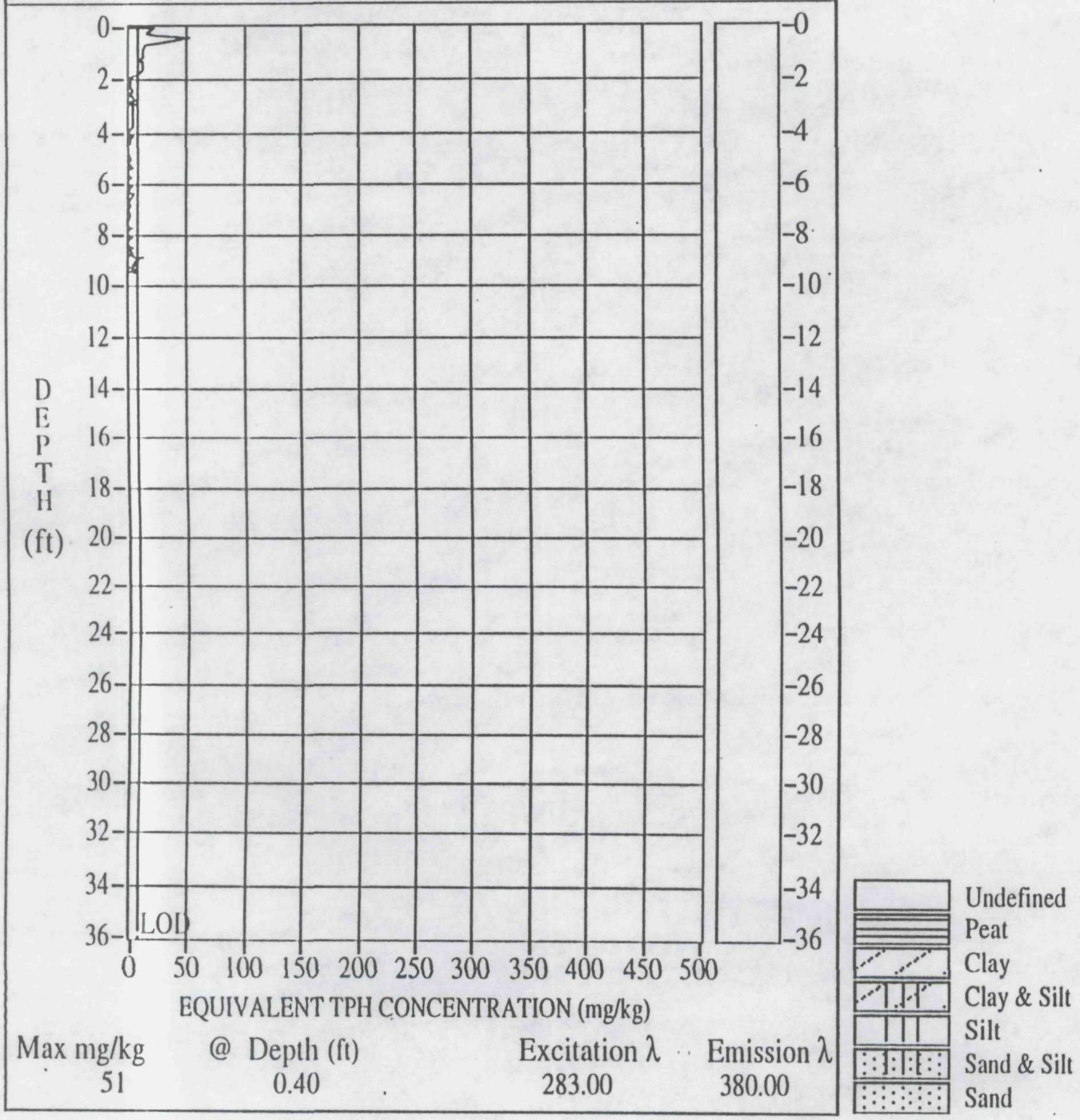
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP007A



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
51	0.40	283.00	380.00

Date: 12/11/95	Geraghty & Miller, Inc.
Proj. No.: HA73	Sylvan Slough, Rock Island, Illinois
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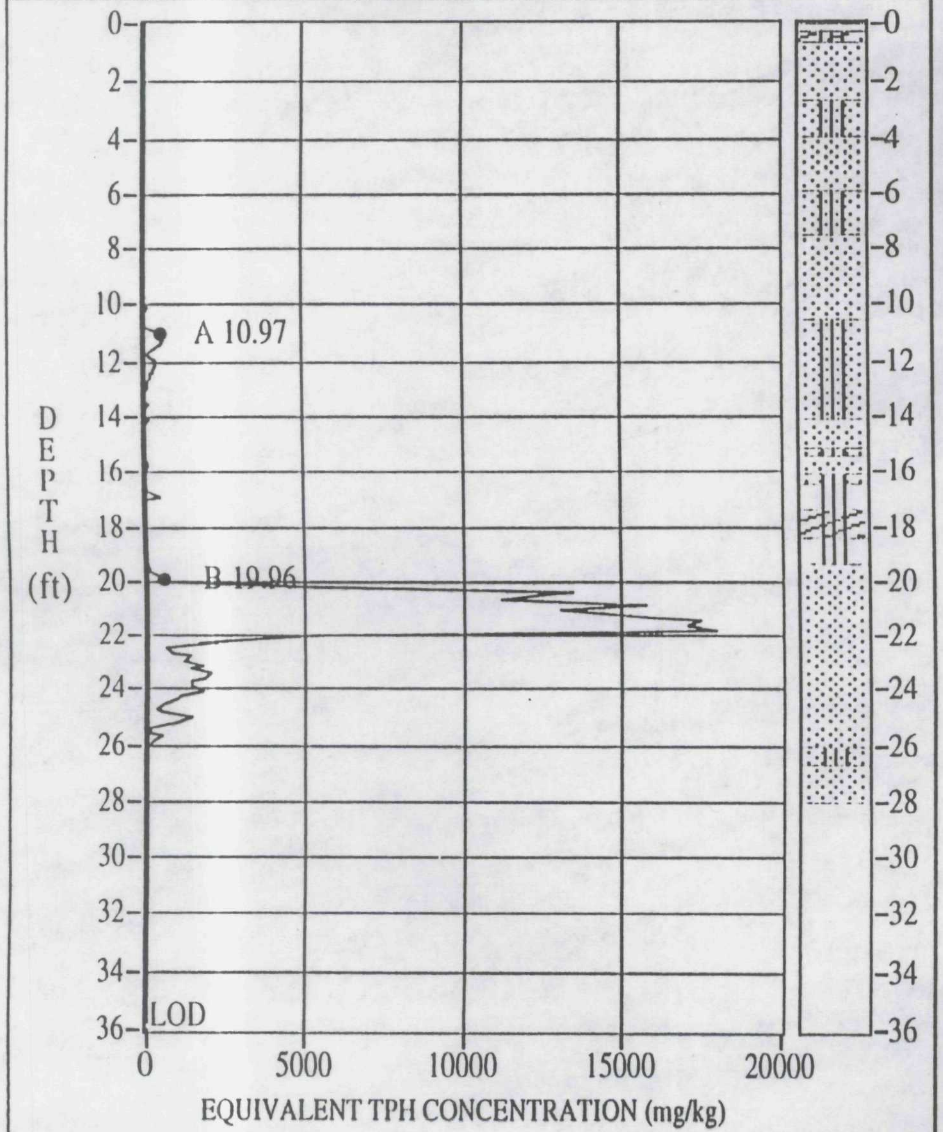
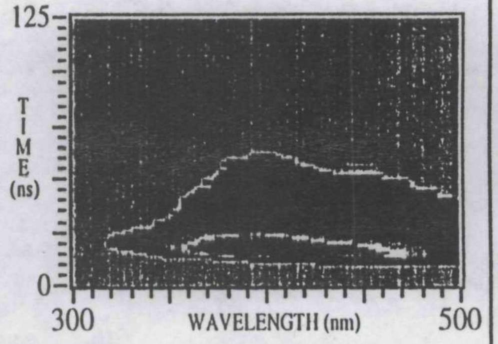
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP007B



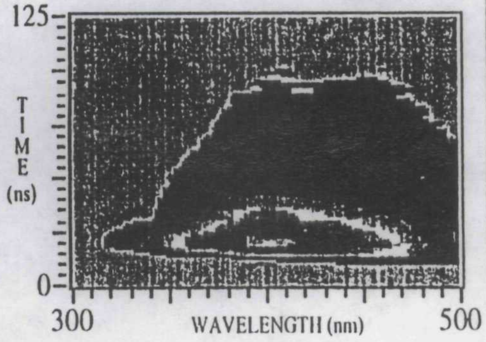
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
17973	21.80	283.00	380.00

A WTM ID : WCP007BA



Peak Signal 0.060095 @ 390.00
FVD Signal 0.055871 @ 380.00

B WTM ID : WCP007BB



Peak Signal 0.049138 @ 400.00
FVD Signal 0.036061 @ 380.00

Undefined
Peat
Clay
Clay & Silt
Silt
Sand & Silt
Sand

Date: 12/14/95	Geraghty & Miller, Inc.
Proj. No.: HA73	Sylvan Slough, Rock Island, Illinois
Checked By: BJT	LORAL ENVIRONMENTAL SYSTEMS
Background Corrected	
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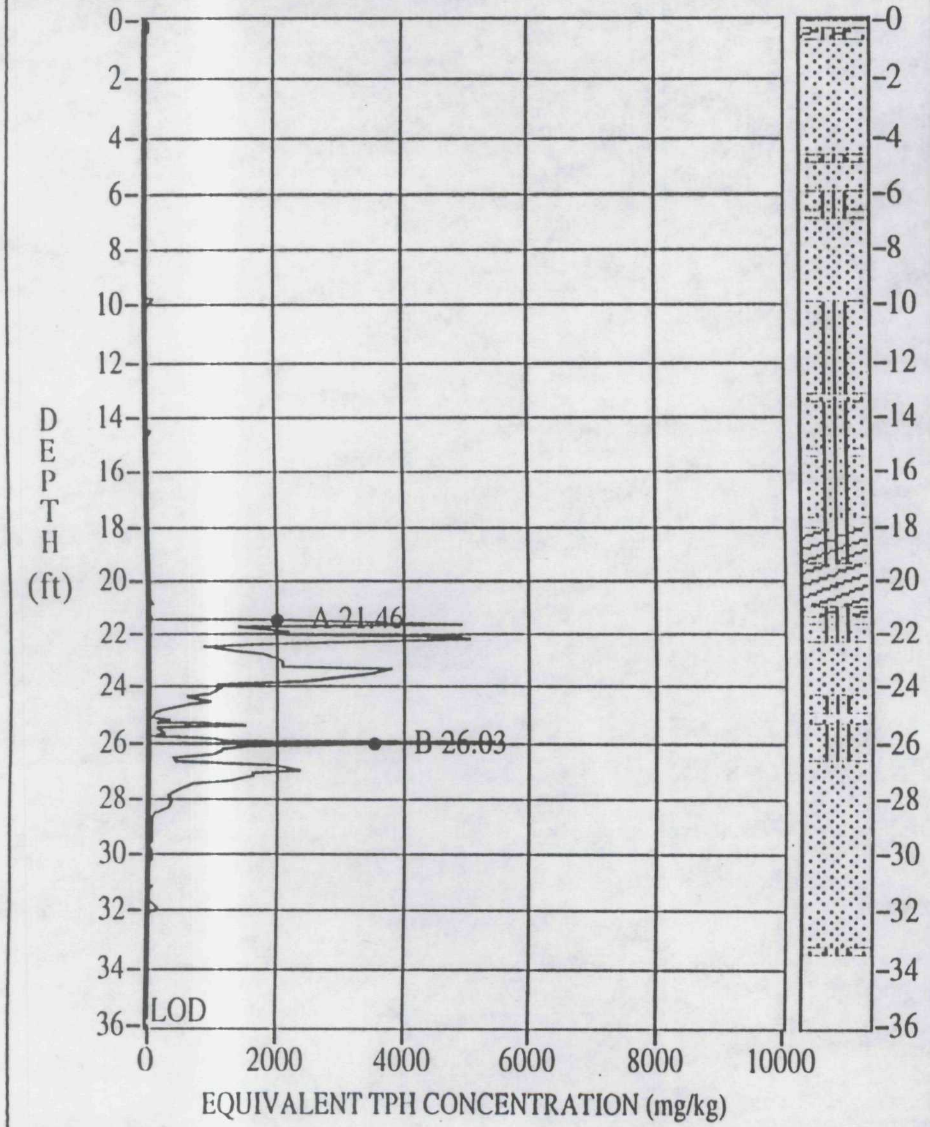
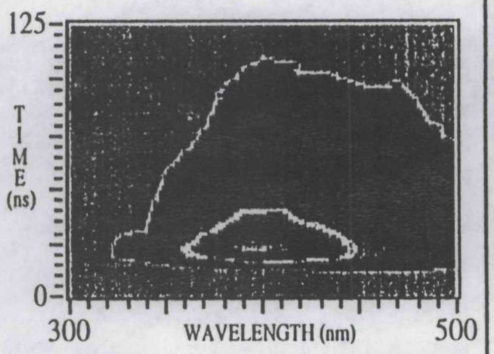
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP008



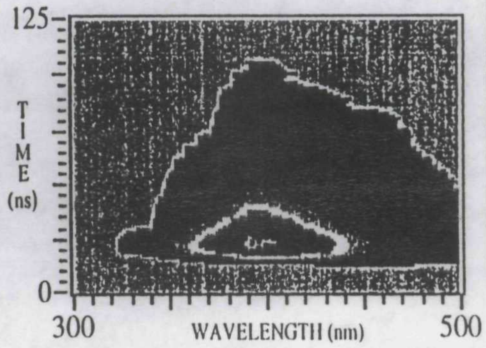
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
5426	25.94	283.00	380.00

A WTM ID : WCP008A



Peak Signal 0.293472 @ 390.00
FVD Signal 0.221352 @ 380.00

B WTM ID : WCP008B



Peak Signal 0.104383 @ 390.00
FVD Signal 0.081865 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/12/95	Geraghty & Miller, Inc.
Proj. No.: HA73	Sylvan Slough, Rock Island, Illinois
Checked By: BJT	LORAL ENVIRONMENTAL SYSTEMS
Background Corrected	
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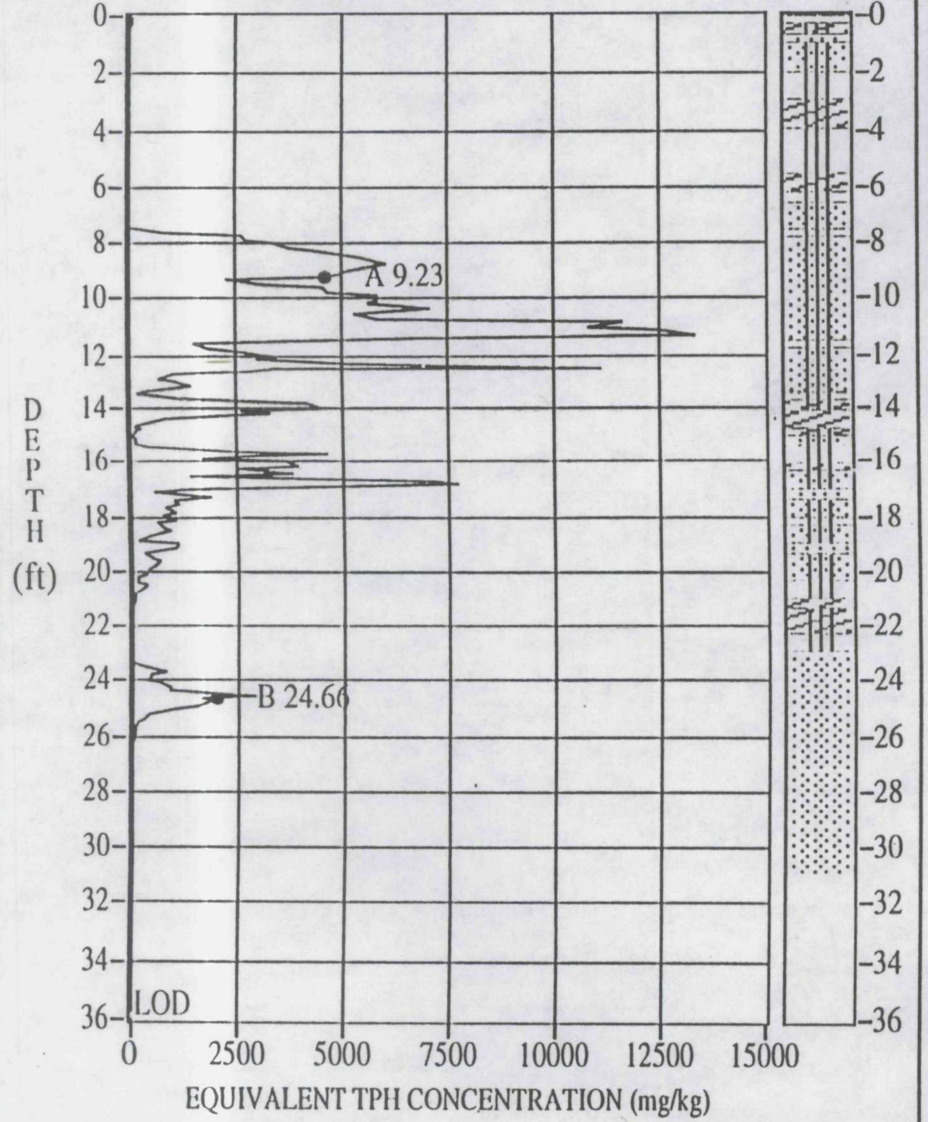
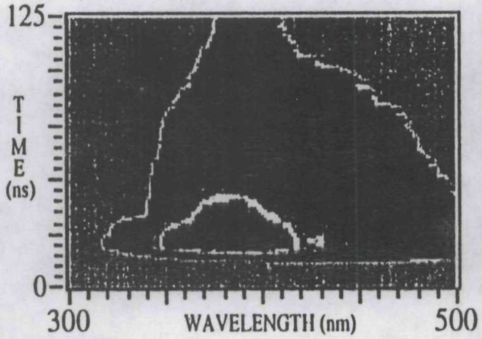
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP009



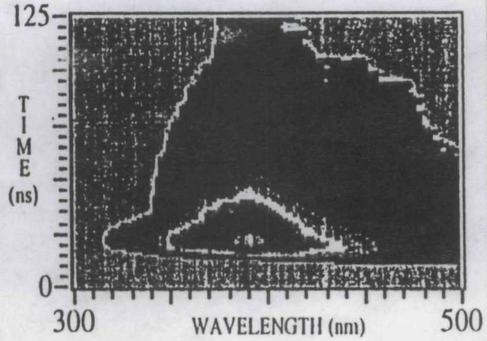
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
13302	11.25	283.00	380.00

A WTM ID : WCP009A



Peak Signal	0.142134 @ 390.00
FVD Signal	0.134540 @ 380.00

B WTM ID : WCP009B



Peak Signal	0.088987 @ 390.00
FVD Signal	0.079085 @ 380.00

Undefined
Peat
Clay
Clay & Silt
Silt
Sand & Silt
Sand

Date: 12/13/95	Geraghty & Miller, Inc.
Proj. No.: HA73	Sylvan Slough, Rock Island, Illinois
Checked By: BJT	LORAL ENVIRONMENTAL SYSTEMS
Background Corrected	
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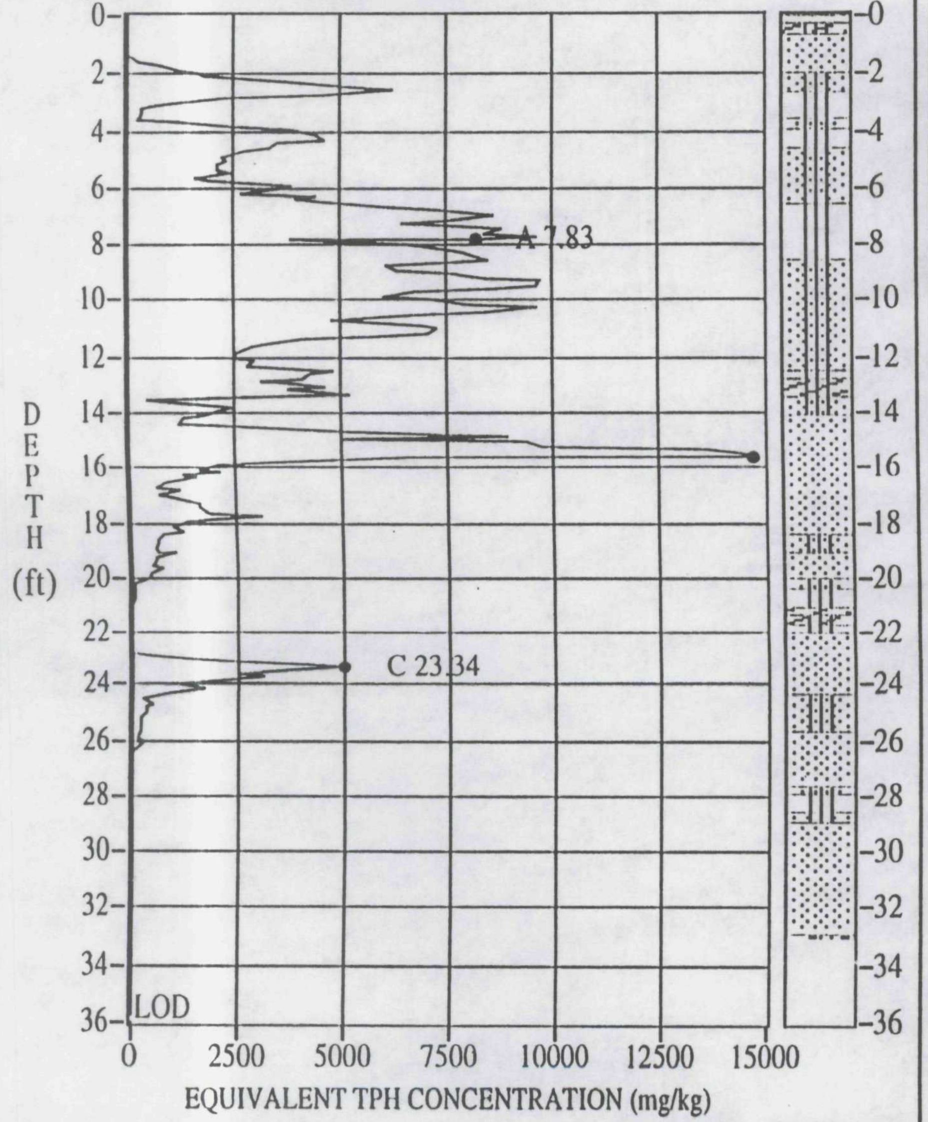
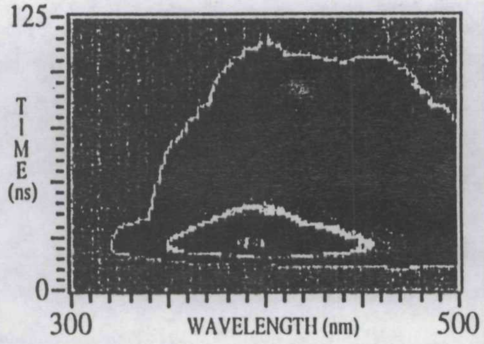
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP010



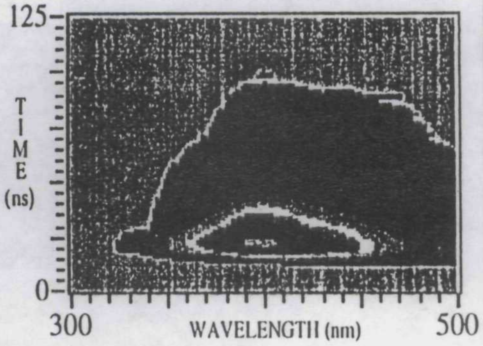
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
14752	15.60	283.00	380.00

A WTM ID : WCP010A



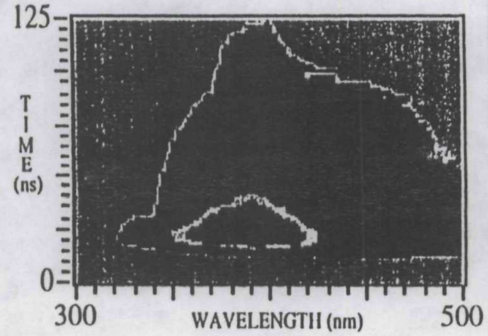
Peak Signal 0.249173 @ 390.00
FVD Signal 0.213521 @ 380.00

B WTM ID : WCP010B



Peak Signal 0.504329 @ 390.00
FVD Signal 0.395961 @ 380.00

C WTM ID : WCP010C



Peak Signal 0.266105 @ 390.00
FVD Signal 0.230546 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/12/95	Geraghty & Miller, Inc.
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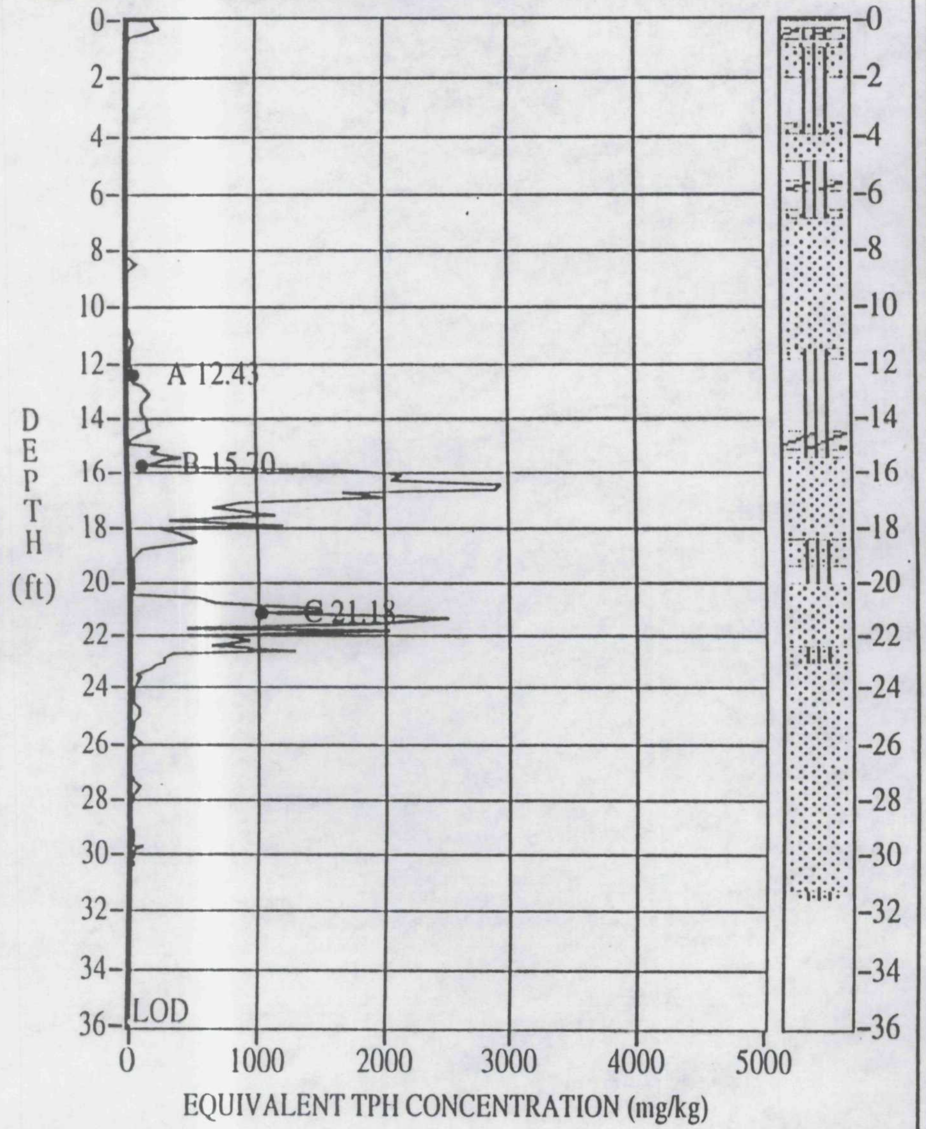
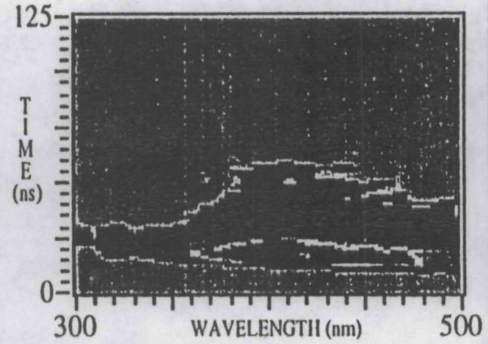
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP011



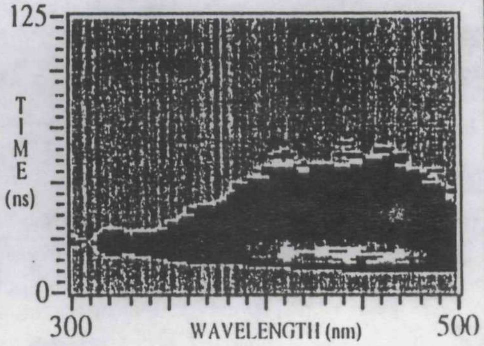
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
2938	16.45	283.00	380.00

A WTM ID : WCP011A



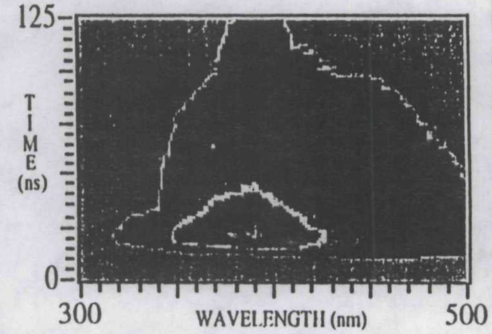
Peak Signal 0.009085 @ 420.00
FVD Signal 0.007687 @ 380.00

B WTM ID : WCP011B



Peak Signal 0.011613 @ 450.00
FVD Signal 0.006536 @ 380.00

C WTM ID : WCP011C



Peak Signal 0.106586 @ 390.00
FVD Signal 0.101313 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/13/95	Geraghty & Miller, Inc.
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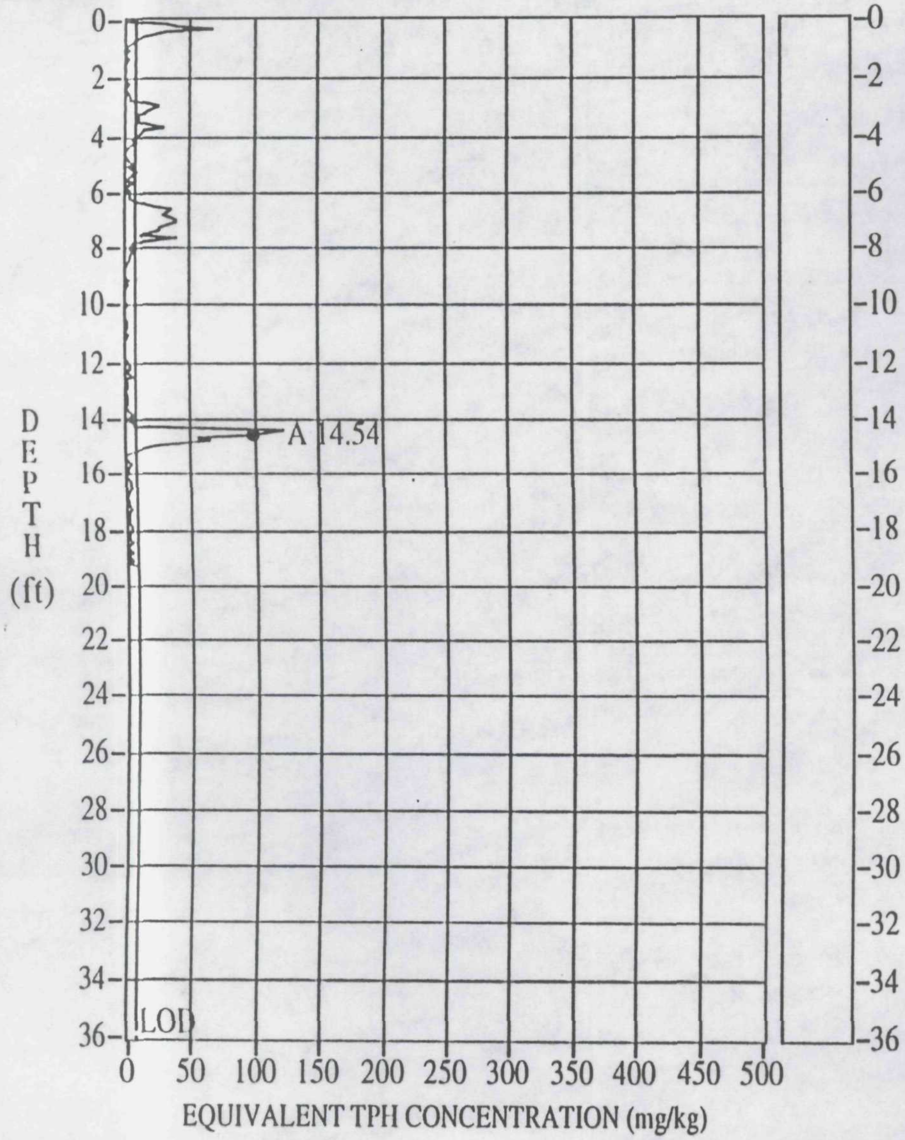
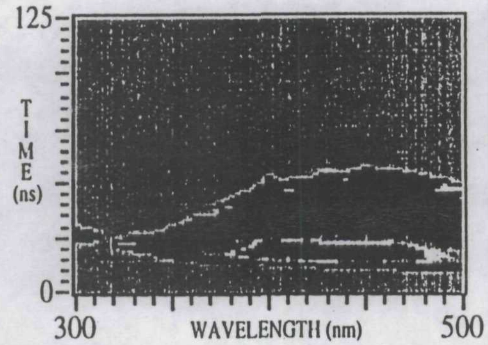
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP012



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
121	14.40	283.00	380.00

A WTM ID : WCP012A



Peak Signal	0.014172 @ 440.00
FVD Signal	0.009811 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/12/95	Proj. No.: HA73	Geraghty & Miller, Inc.
Checked By: BJT		Sylvan Slough, Rock Island, Illinois
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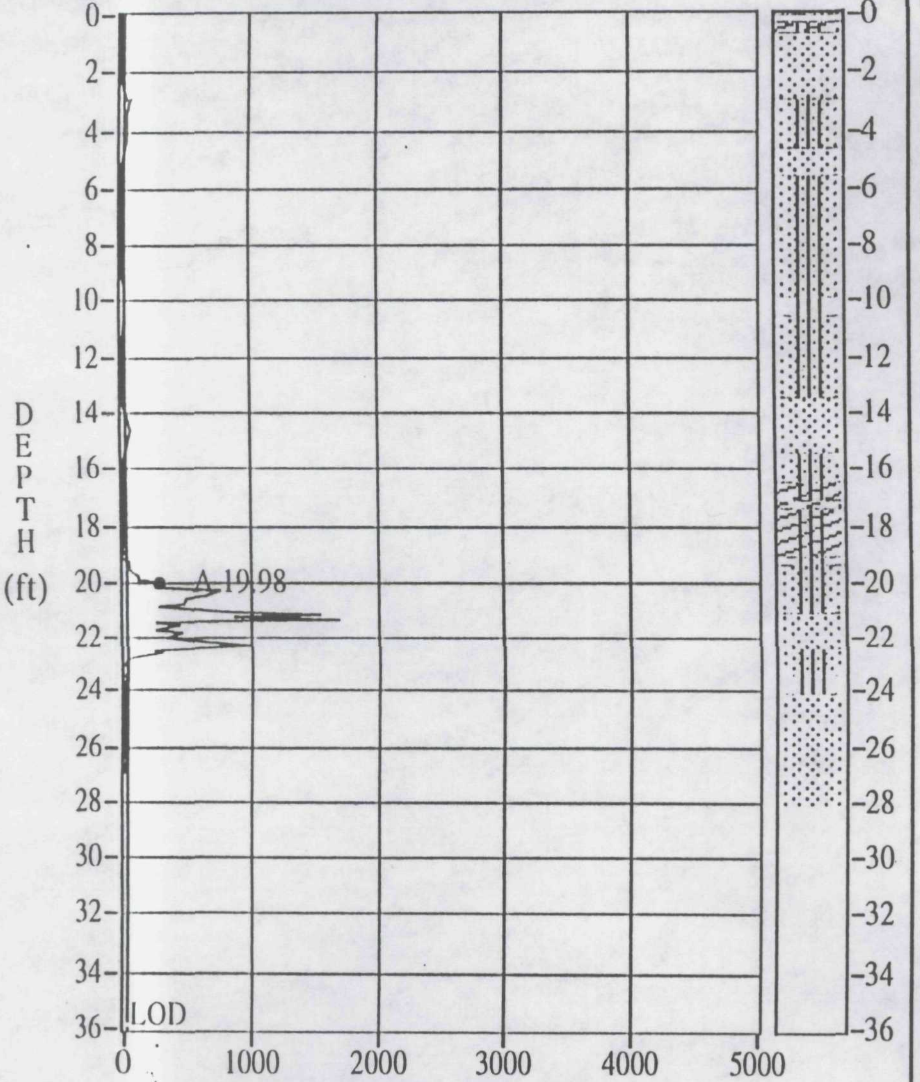
INTEGRATED ROST/CPT DATA LOG

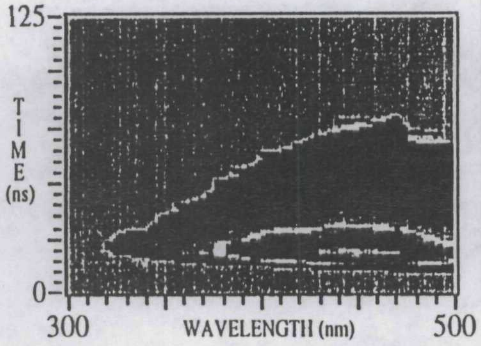
FVD ID : CP012A



EQUIVALENT TPH CONCENTRATION (mg/kg)

Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
1688	21.32	283.00	380.00

A WTM ID : WCP012AA



Peak Signal 0.047727 @ 450.00
FVD Signal 0.025690 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/12/95	Geraghty & Miller, Inc.
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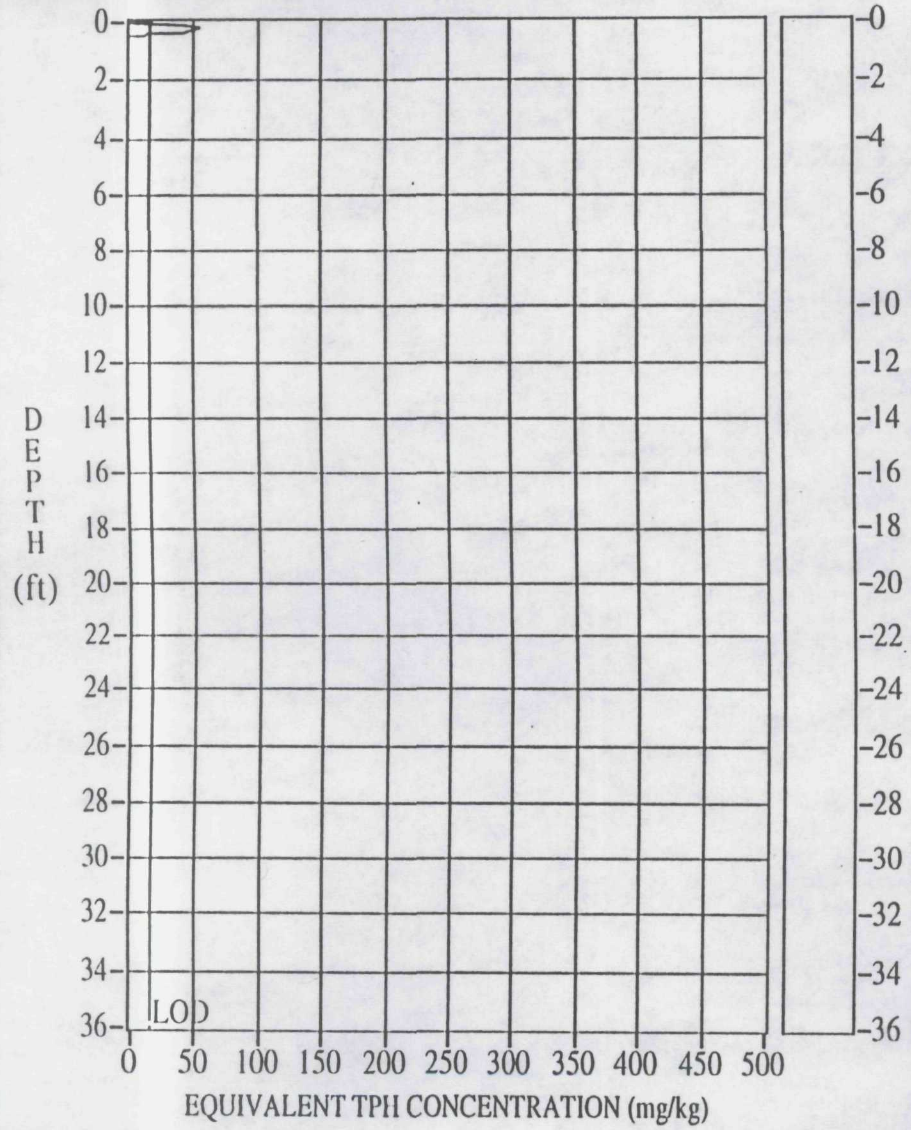
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP013A



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
53	0.23	283.00	380.00

Undefined
Peat
Clay
Clay & Silt
Silt
Sand & Silt
Sand

Date: 12/12/95	Geraghty & Miller, Inc.
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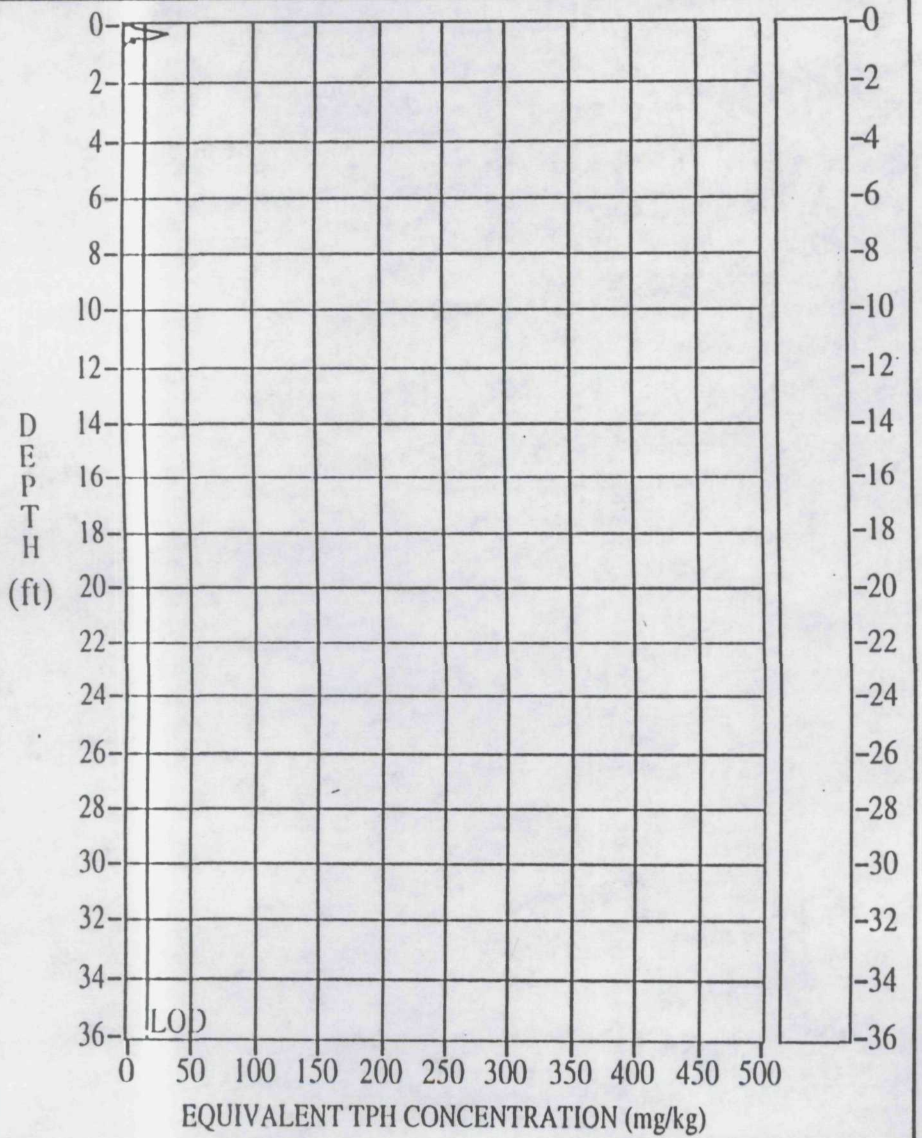
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP013B



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
31	0.24	283.00	380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/12/95	Geraghty & Miller, Inc.
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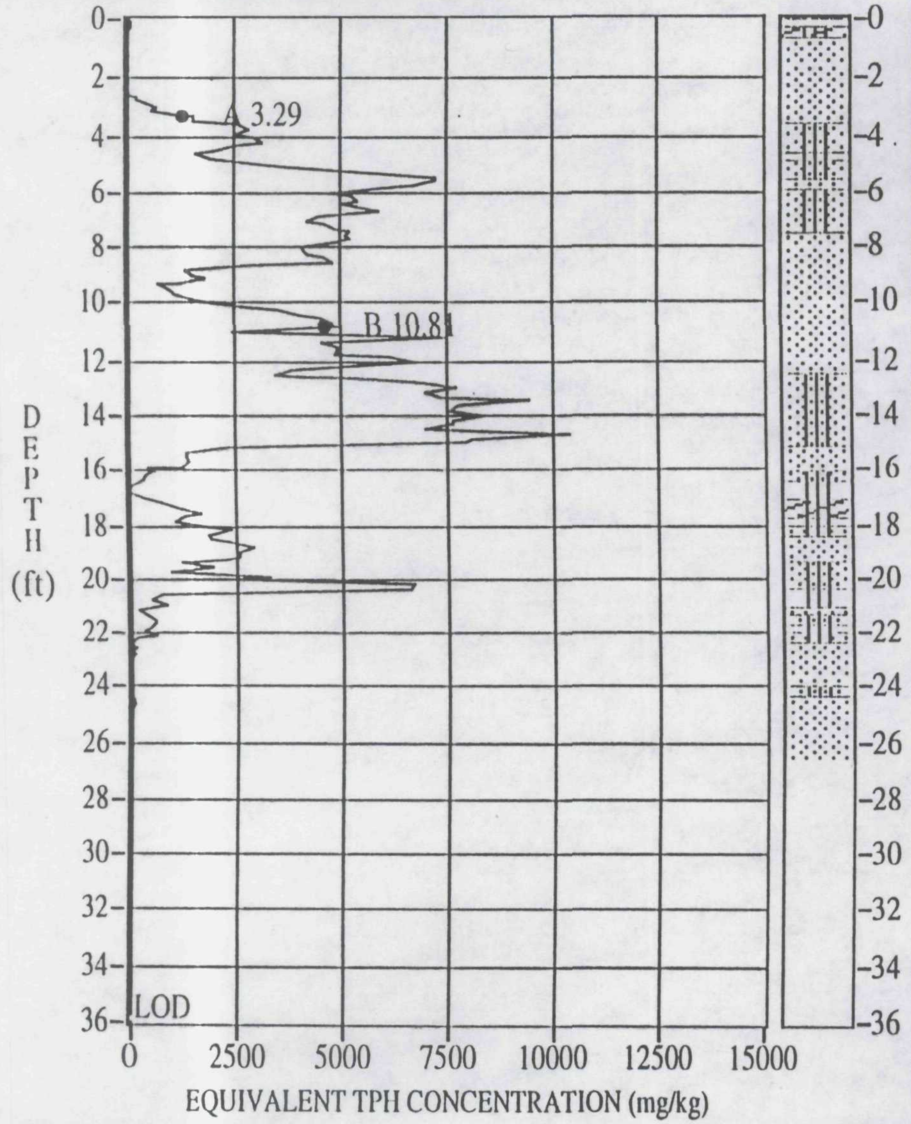
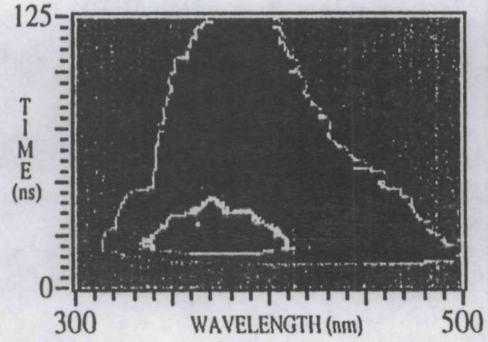
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP013C



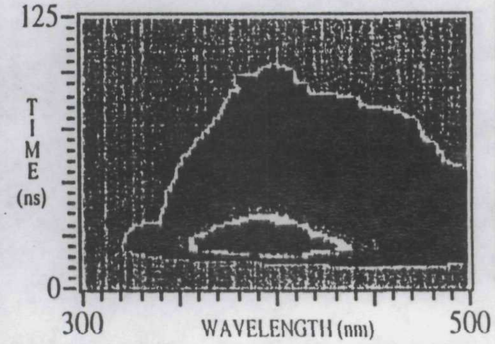
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
10397	14.66	283.00	380.00

A WTM ID : WCP013CA

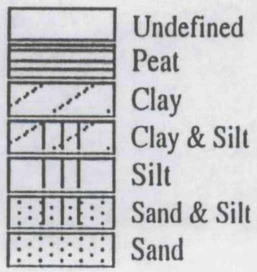


Peak Signal 0.061808 @ 360.00
FVD Signal 0.056315 @ 380.00

B WTM ID : WCP013CB



Peak Signal 0.250180 @ 390.00
FVD Signal 0.216793 @ 380.00



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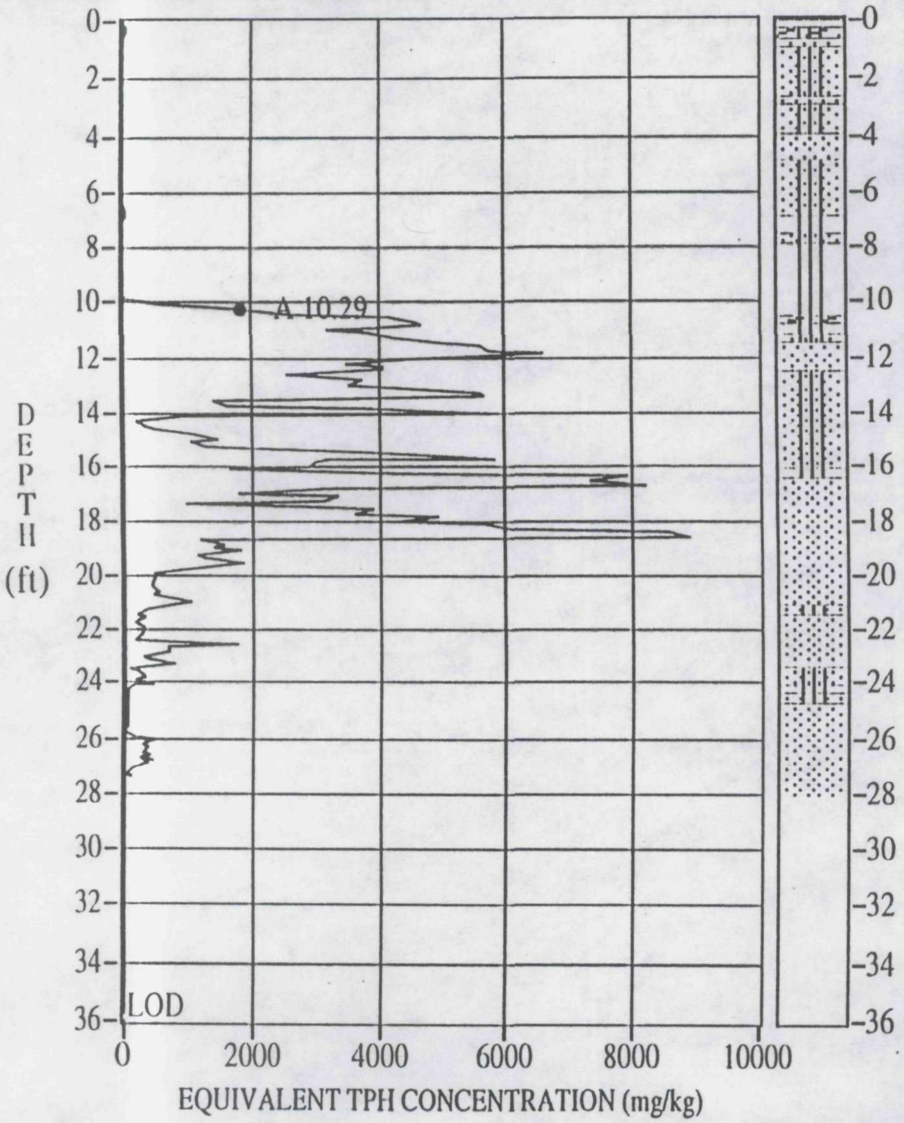
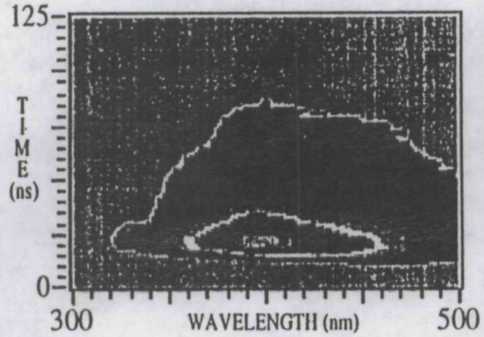
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP014

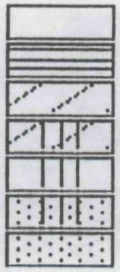


Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
8897	18.60	283.00	380.00

A WTM ID : WCP014A



Peak Signal 0.138785 @ 390.00
FVD Signal 0.112907 @ 380.00



Date: 12/12/95	Geraghty & Miller, Inc.
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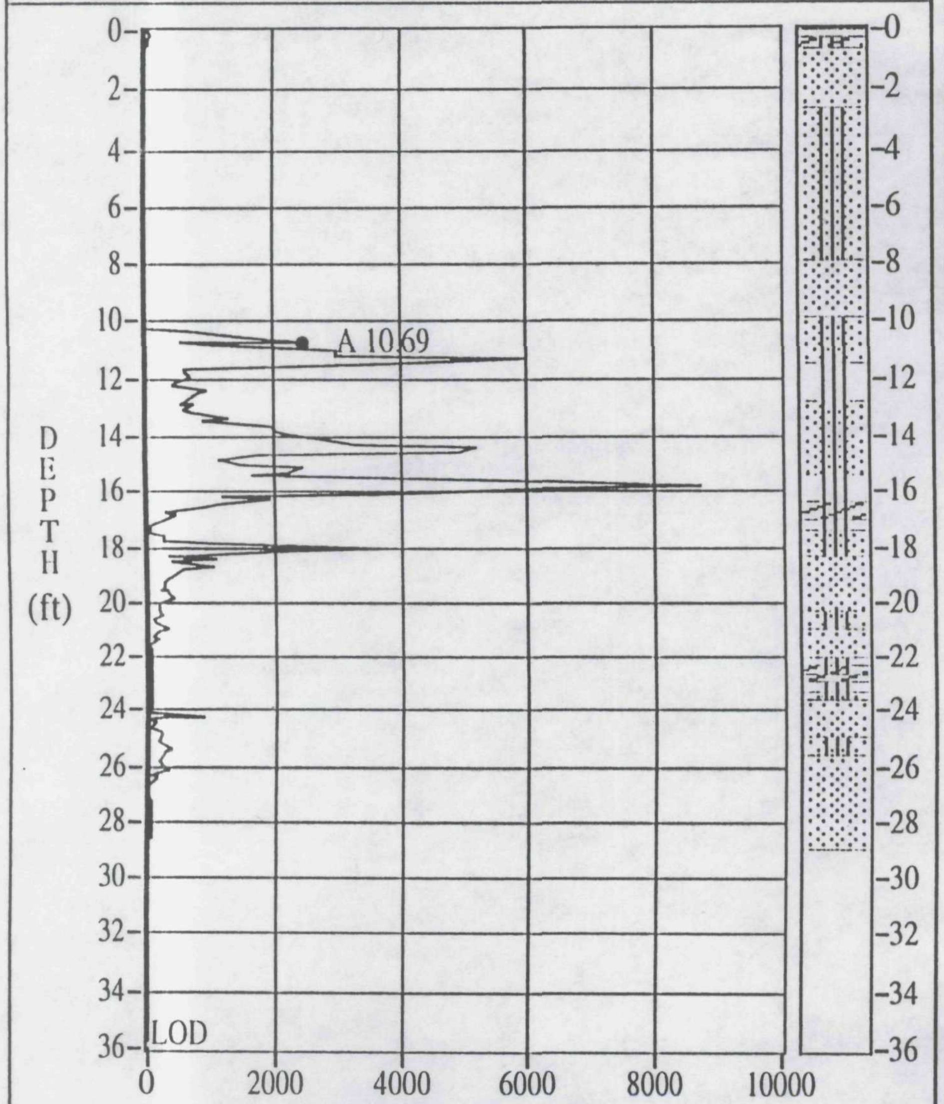
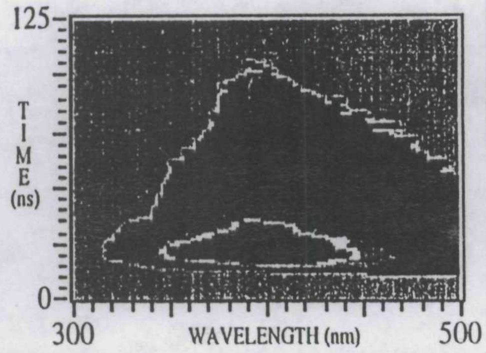
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP015



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
8735	15.77	283.00	380.00

A WTM ID : WCP015A



Peak Signal	0.034069 @ 400.00
FVD Signal	0.031906 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/12/95	Geraghty & Miller, Inc.
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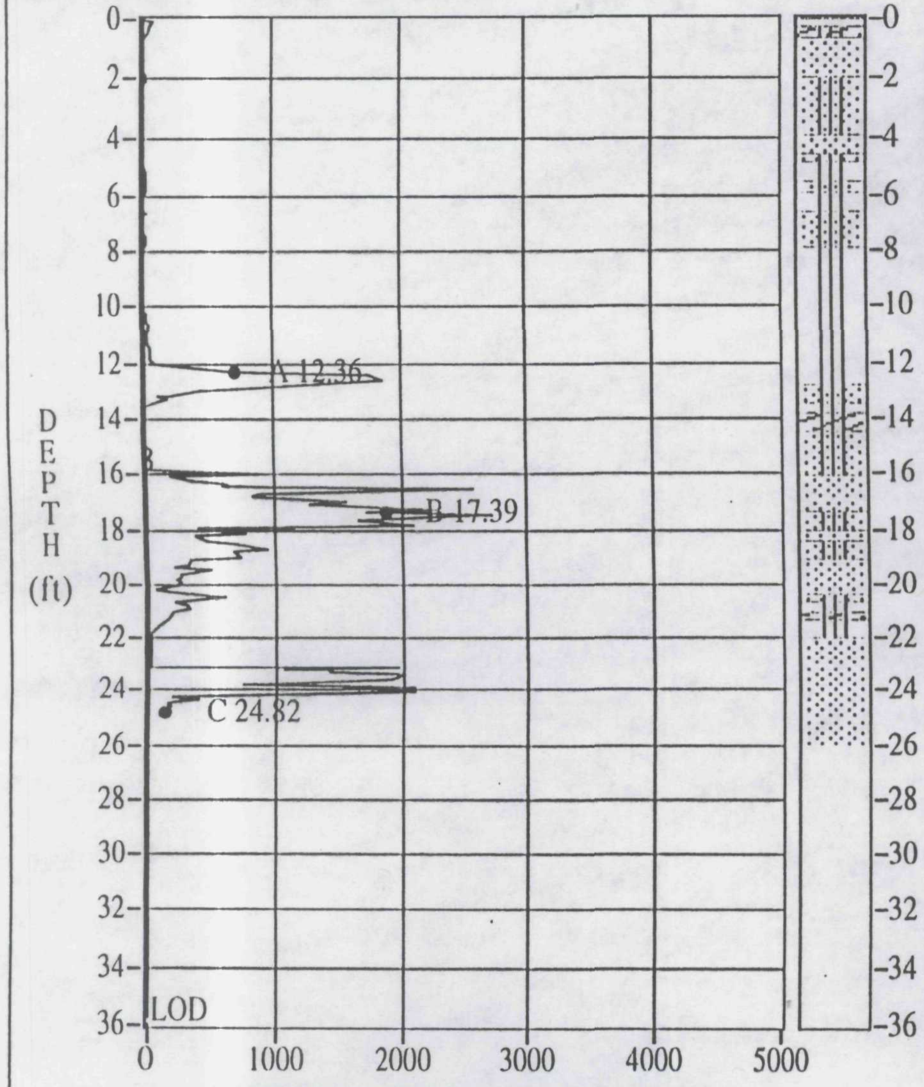
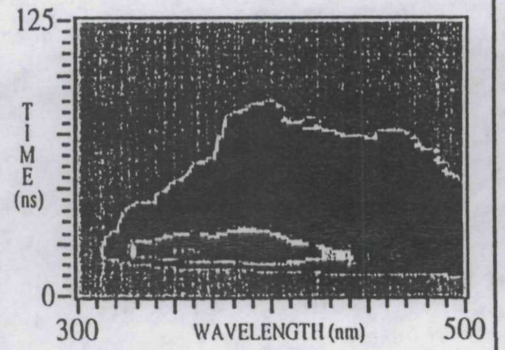
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP016



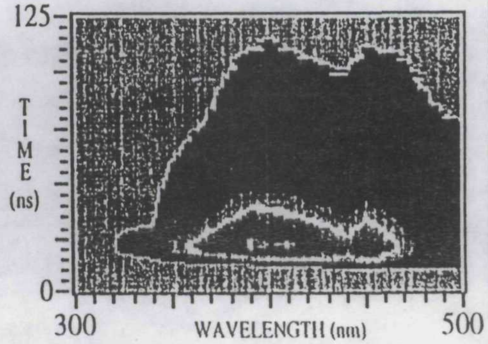
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
2705	17.47	283.00	380.00

A WTM ID : WCP016A



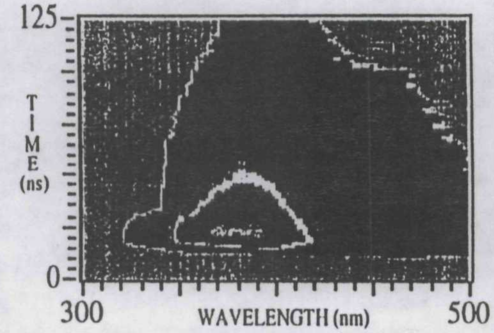
Peak Signal 0.093280 @ 360.00
FVD Signal 0.083079 @ 380.00

B WTM ID : WCP016B

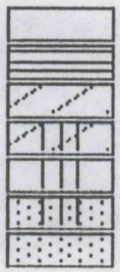


Peak Signal 0.124559 @ 390.00
FVD Signal 0.097305 @ 380.00

C WTM ID : WCP016C



Peak Signal 0.089188 @ 370.00
FVD Signal 0.085850 @ 380.00



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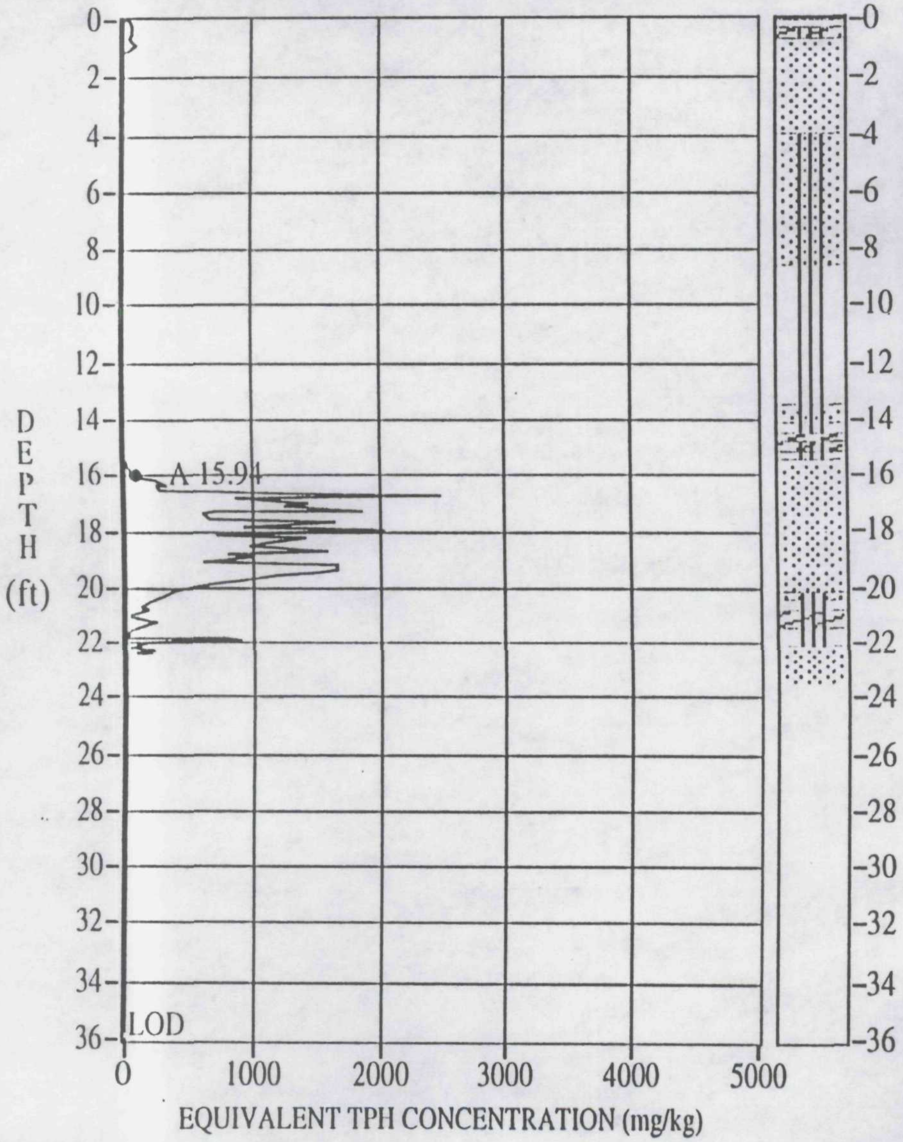
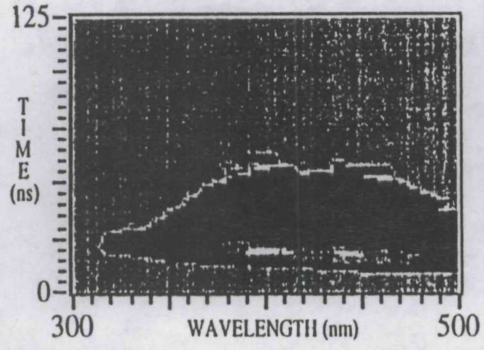
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP017



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
2489	16.77	283.00	380.00

A WTM ID : WCP017A



Peak Signal 0.010492 @ 400.00
FVD Signal 0.007716 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/12/95	Geraghty & Miller, Inc.
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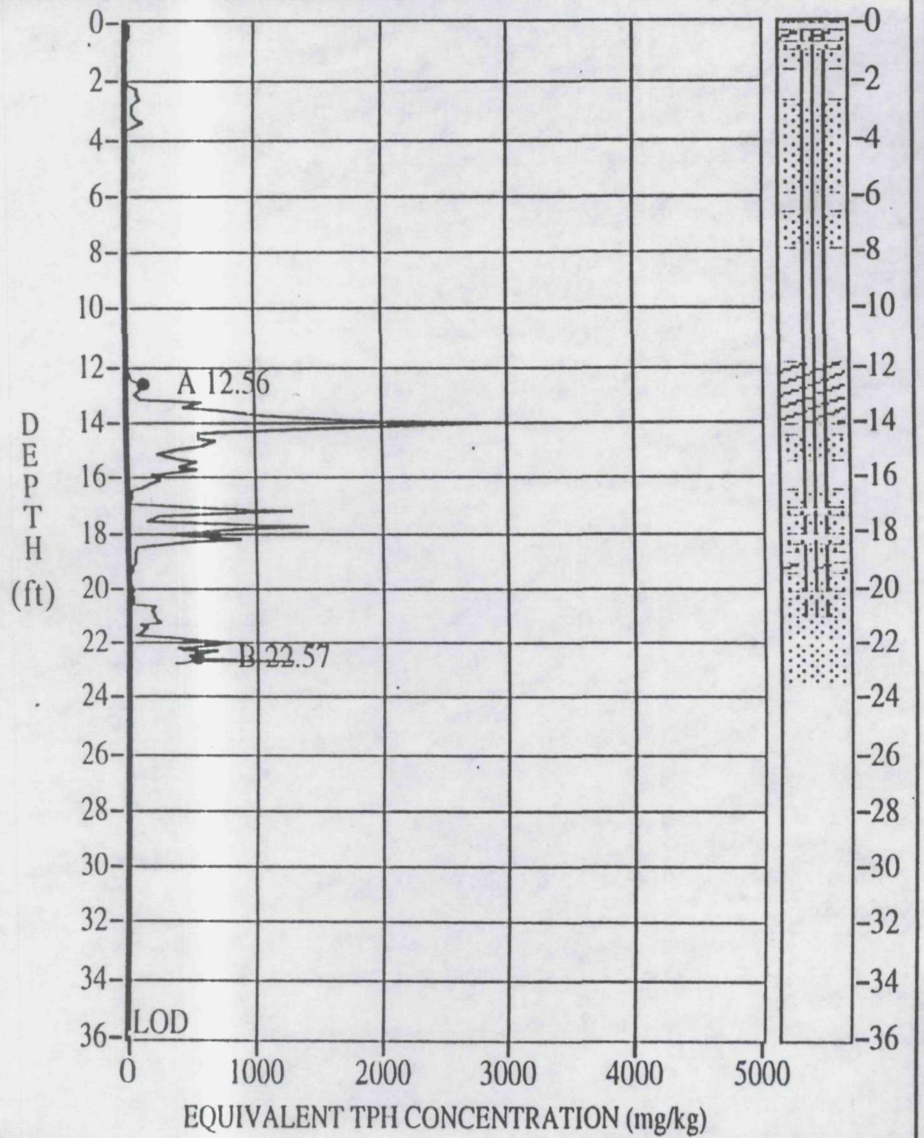
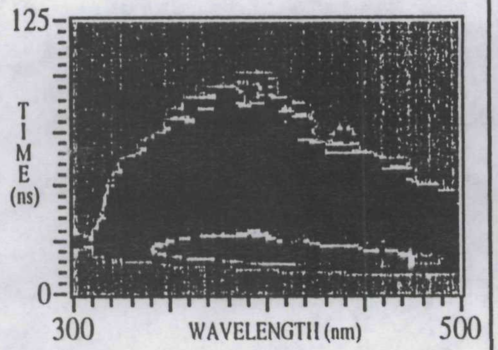
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP018



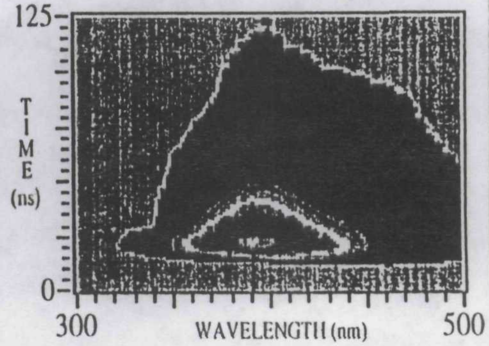
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
2854	14.04	283.00	380.00

A WTM ID : WCP018A



Peak Signal	0.017385 @ 390.00
FVD Signal	0.015411 @ 380.00

B WTM ID : WCP018B



Peak Signal	0.440830 @ 390.00
FVD Signal	0.368776 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/13/95	Geraghty & Miller, Inc.
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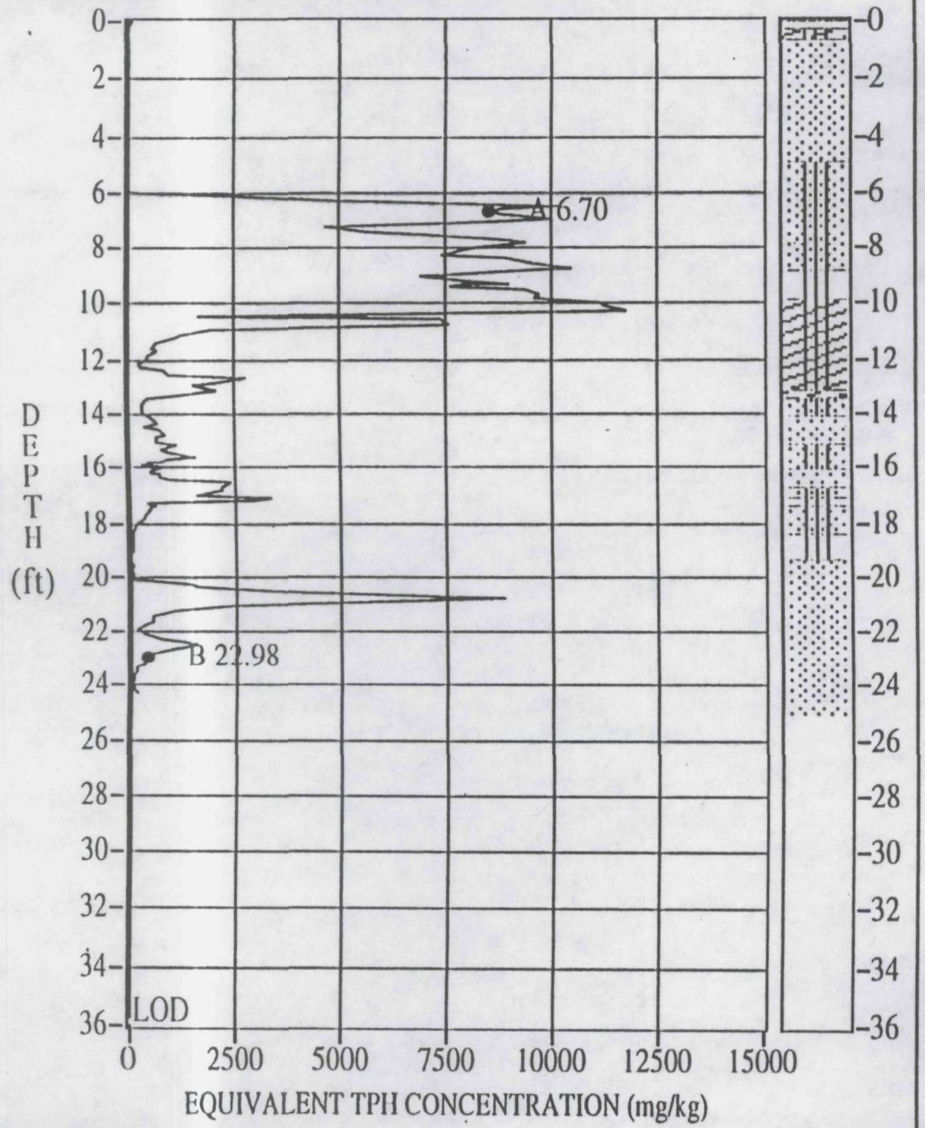
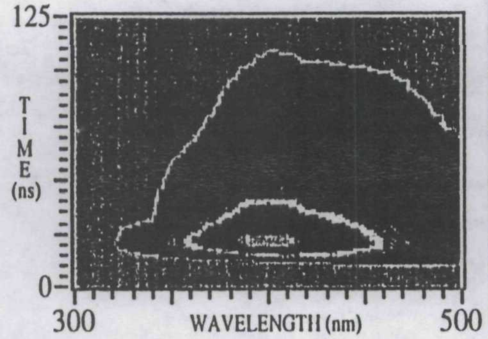
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP019



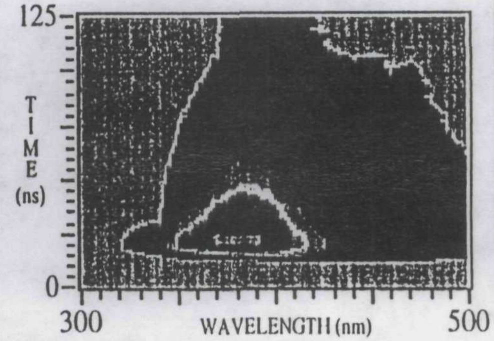
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
11748	10.25	283.00	380.00

A WTM ID : WCP019A

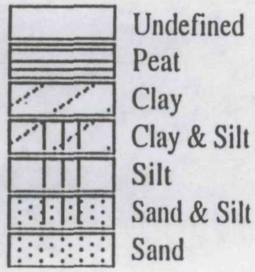


Peak Signal	0.549799 @ 390.00
FVD Signal	0.441580 @ 380.00

B WTM ID : WCP020B



Peak Signal	0.187641 @ 370.00
FVD Signal	0.181467 @ 380.00



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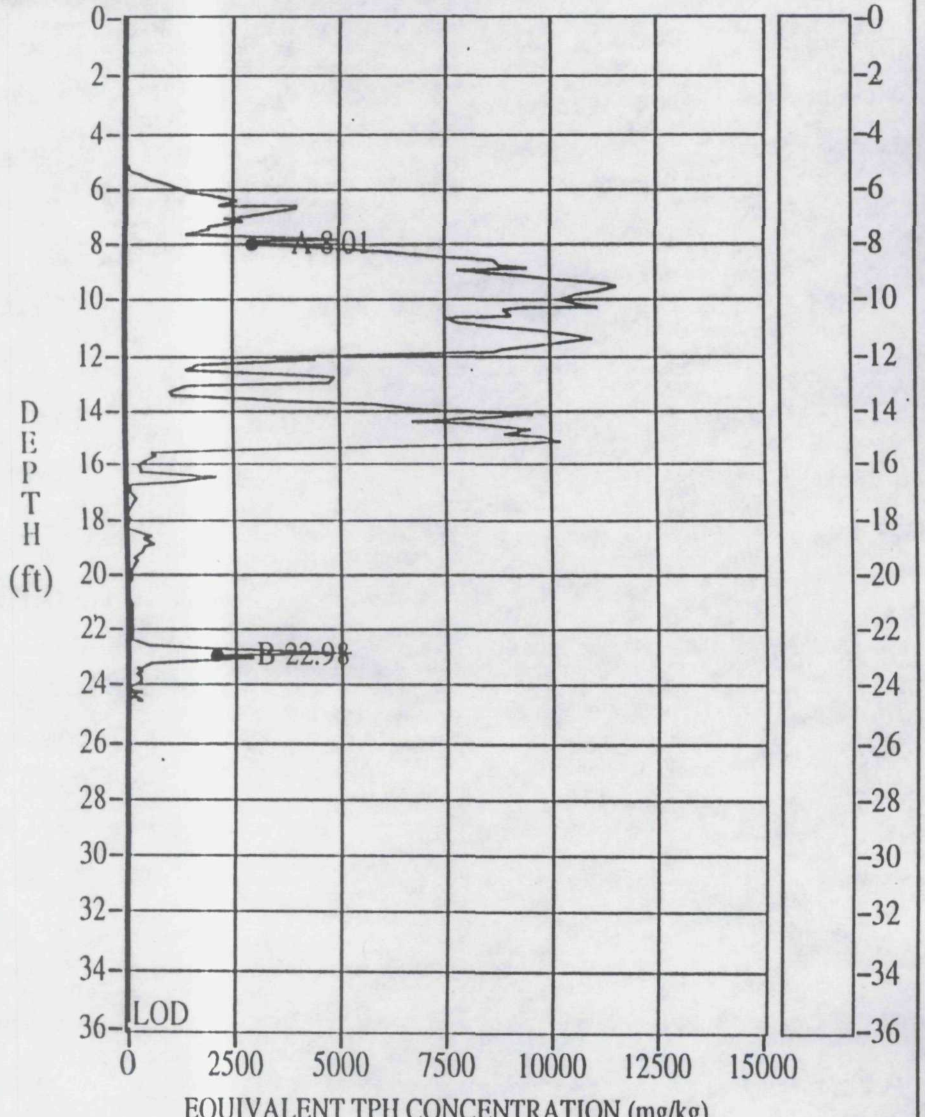
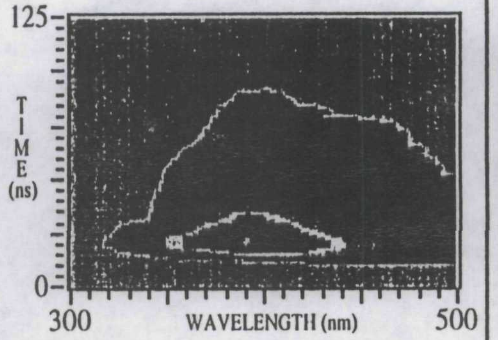
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP020



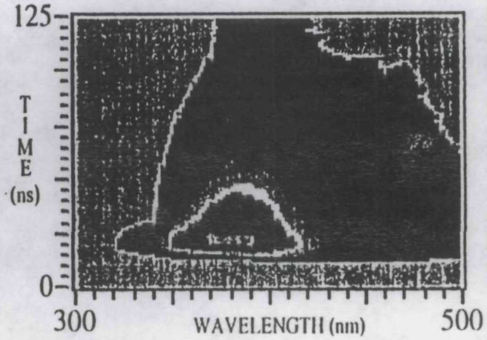
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
11537	9.52	283.00	380.00

A WTM ID : WCP020A



Peak Signal	0.204123 @ 390.00
FVD Signal	0.171206 @ 380.00

B WTM ID : WCP020B



Peak Signal	0.187641 @ 370.00
FVD Signal	0.181467 @ 380.00

Undefined
Peat
Clay
Clay & Silt
Silt
Sand & Silt
Sand

Date: 12/13/95	Geraghty & Miller, Inc.
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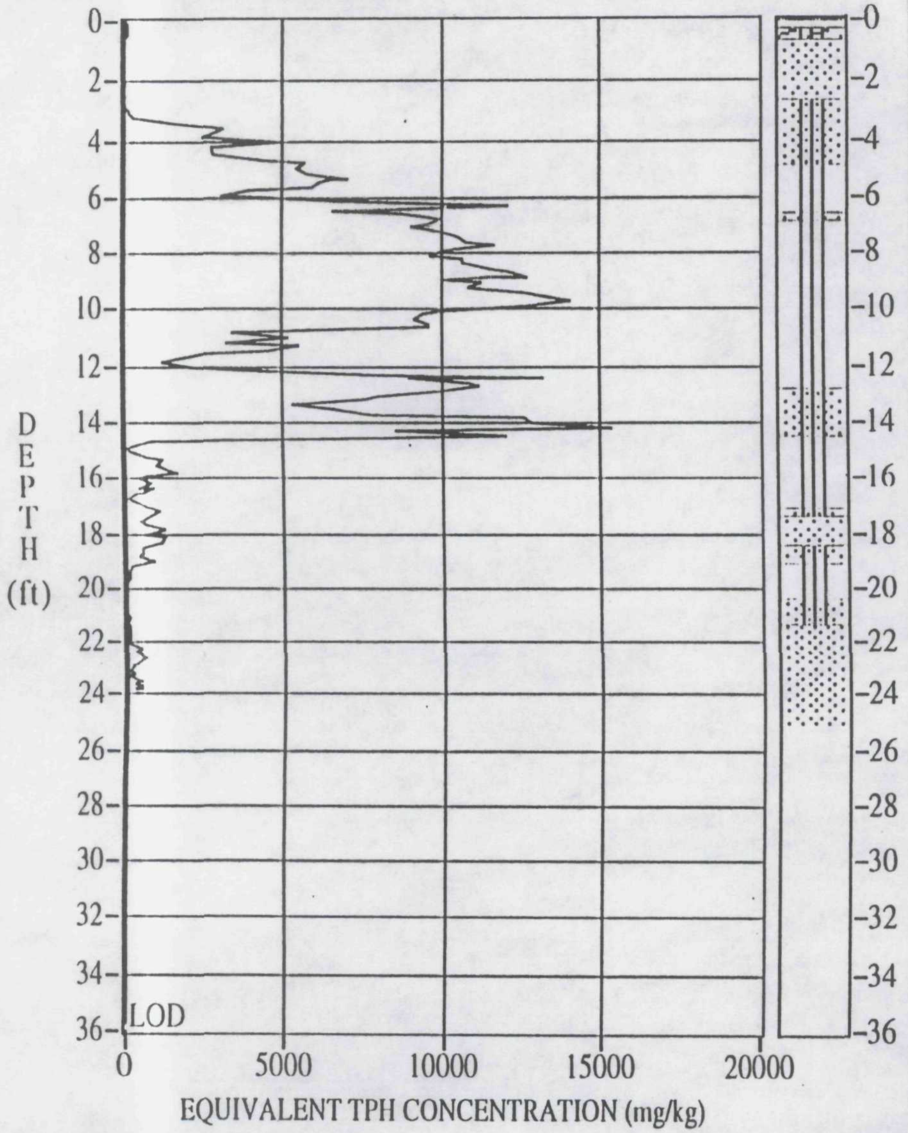
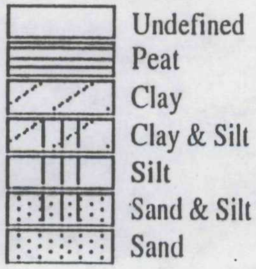
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP020A



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
15293	14.16	283.00	380.00



Date: 12/13/95	Geraghty & Miller, Inc.	
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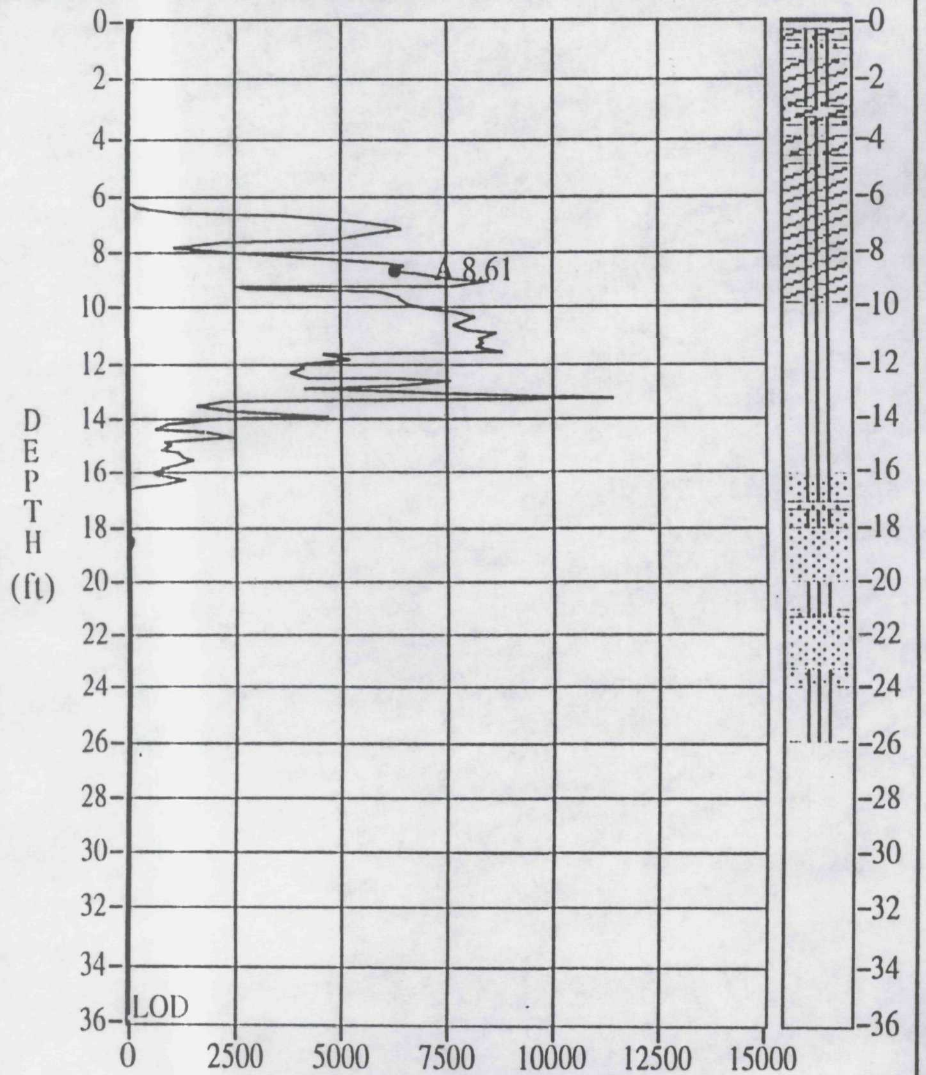
INTEGRATED ROST/CPT DATA LOG

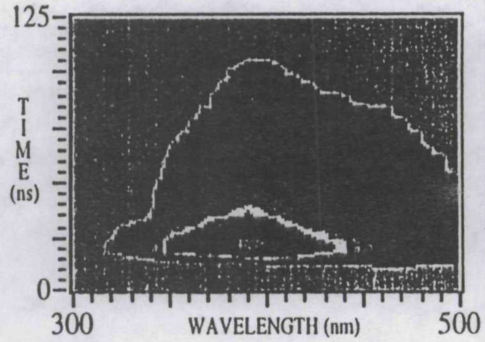
FVD ID : CP021



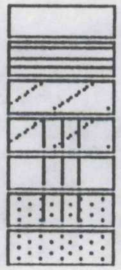
EQUIVALENT TPH CONCENTRATION (mg/kg)

Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
11387	13.22	283.00	380.00

A WTM ID : WCP021A



Peak Signal	0.188894 @ 390.00
FVD Signal	0.168907 @ 380.00



Undefined
Peat
Clay
Clay & Silt
Silt
Sand & Silt
Sand

Date: 12/15/95	Geraghty & Miller, Inc.
Proj. No.: HA73	Sylvan Slough, Rock Island, Illinois
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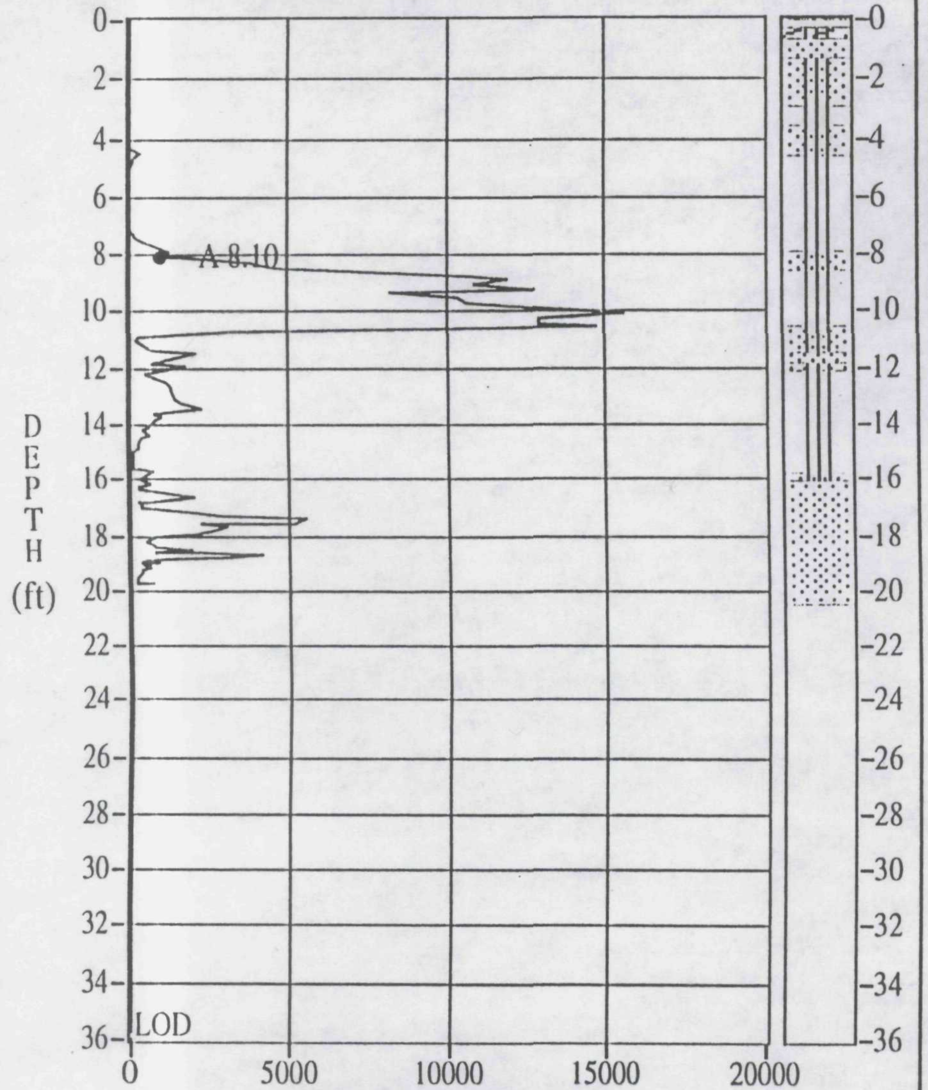
INTEGRATED ROST/CPT DATA LOG

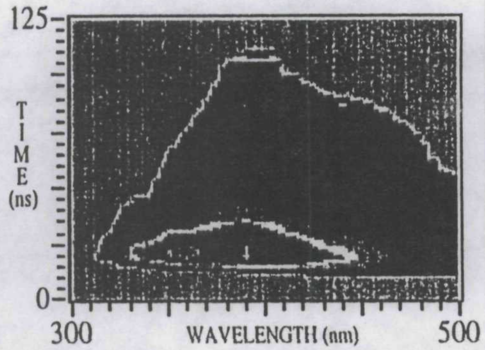
FVD ID : CP023



EQUIVALENT TPH CONCENTRATION (mg/kg)

Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
15541	10.10	283.00	380.00

A WTM ID : WCP023A



Peak Signal 0.093731 @ 360.00
FVD Signal 0.084527 @ 380.00

Undefined
Peat
Clay
Clay & Silt
Silt
Sand & Silt
Sand

Date: 12/14/95	Geraghty & Miller, Inc.
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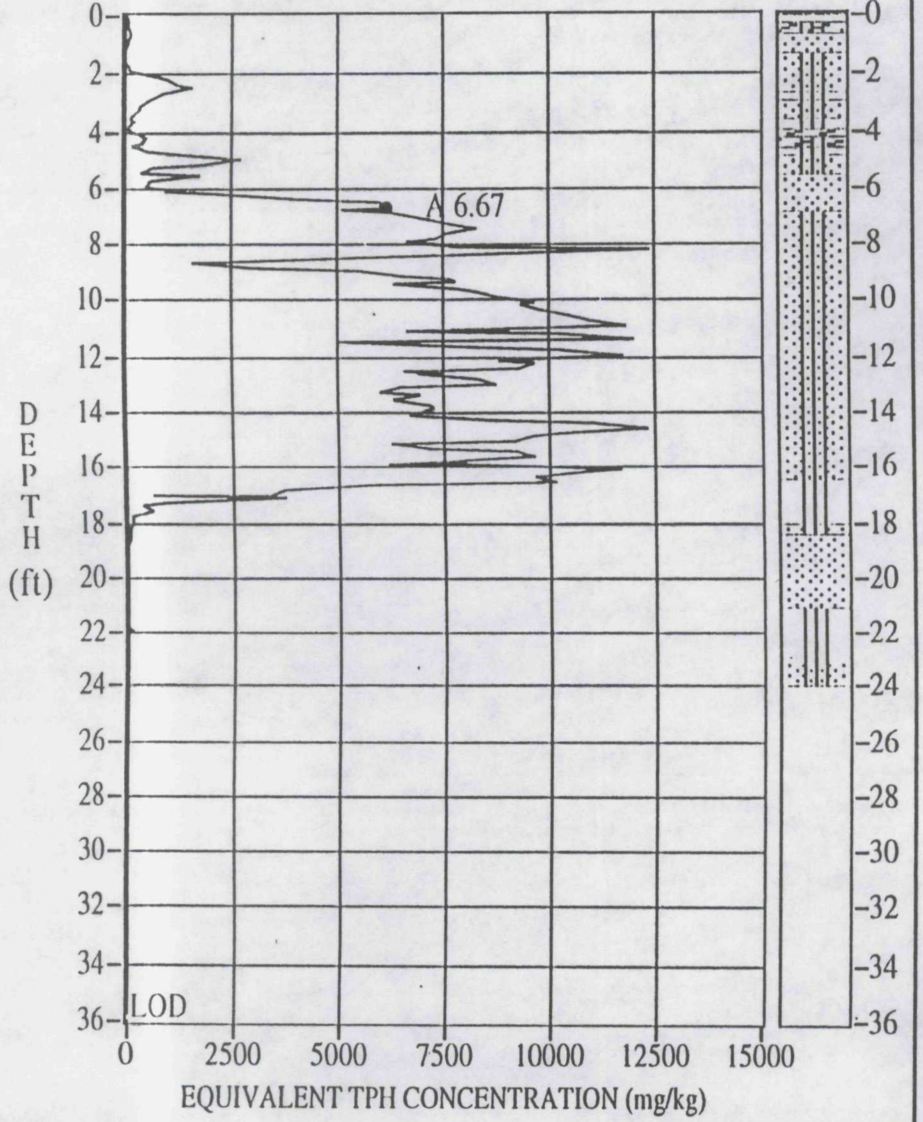
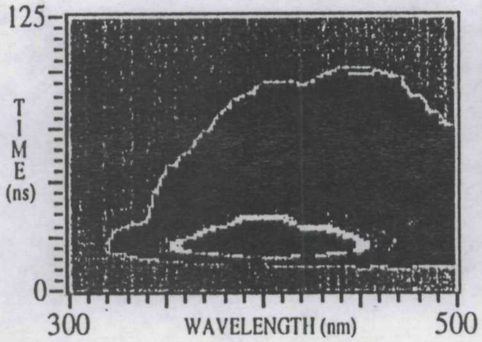
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP024



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
12397	8.20	283.00	380.00

A WTM ID : WCP024A



Peak Signal 0.258949 @ 390.00
FVD Signal 0.210083 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date:	12/15/95	Geraghty & Miller, Inc.
Proj. No.:	HA73	Sylvan Slough, Rock Island, Illinois
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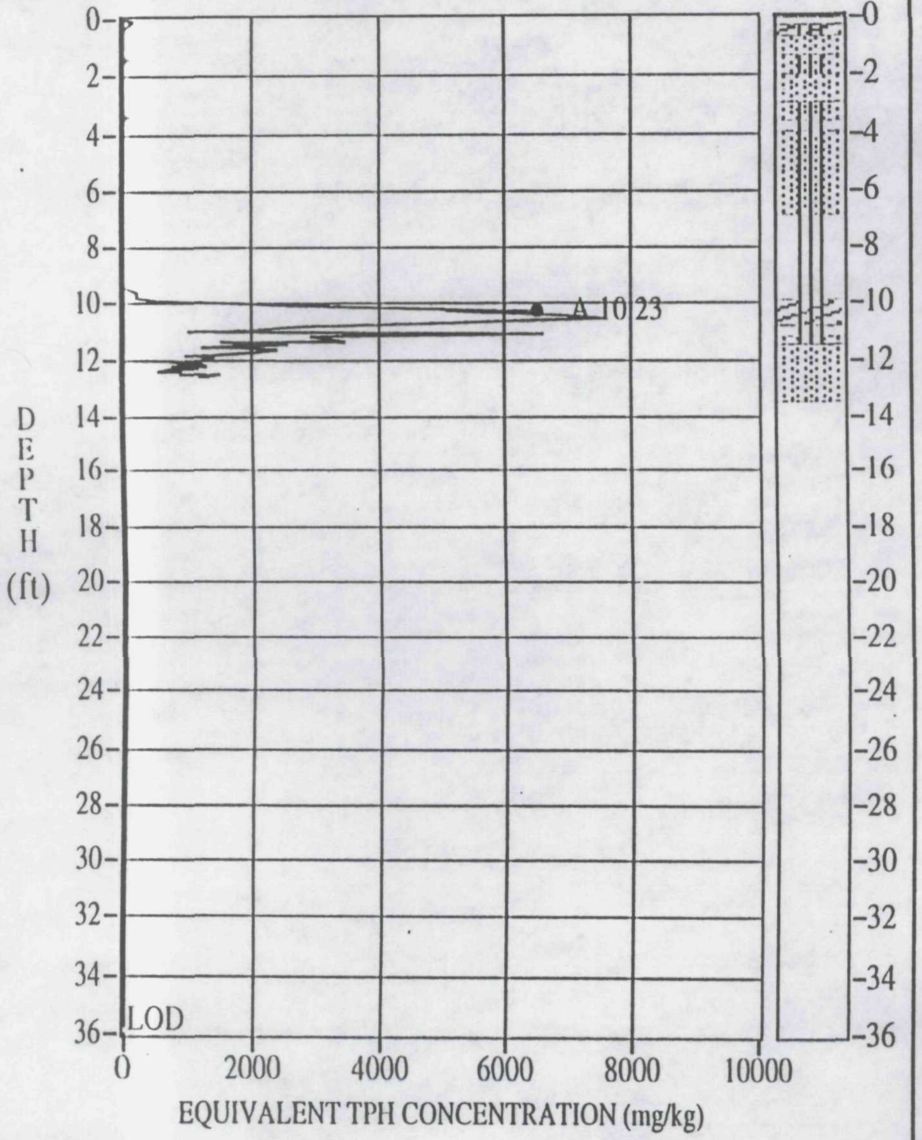
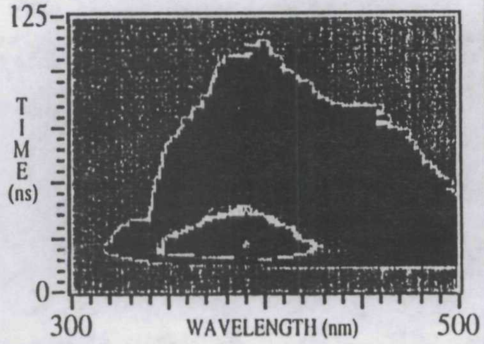
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP025



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
7559	10.54	283.00	380.00

A WTM ID : WCP025A



Peak Signal 0.223565 @ 390.00
FVD Signal 0.194905 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/14/95	Geraghty & Miller, Inc.
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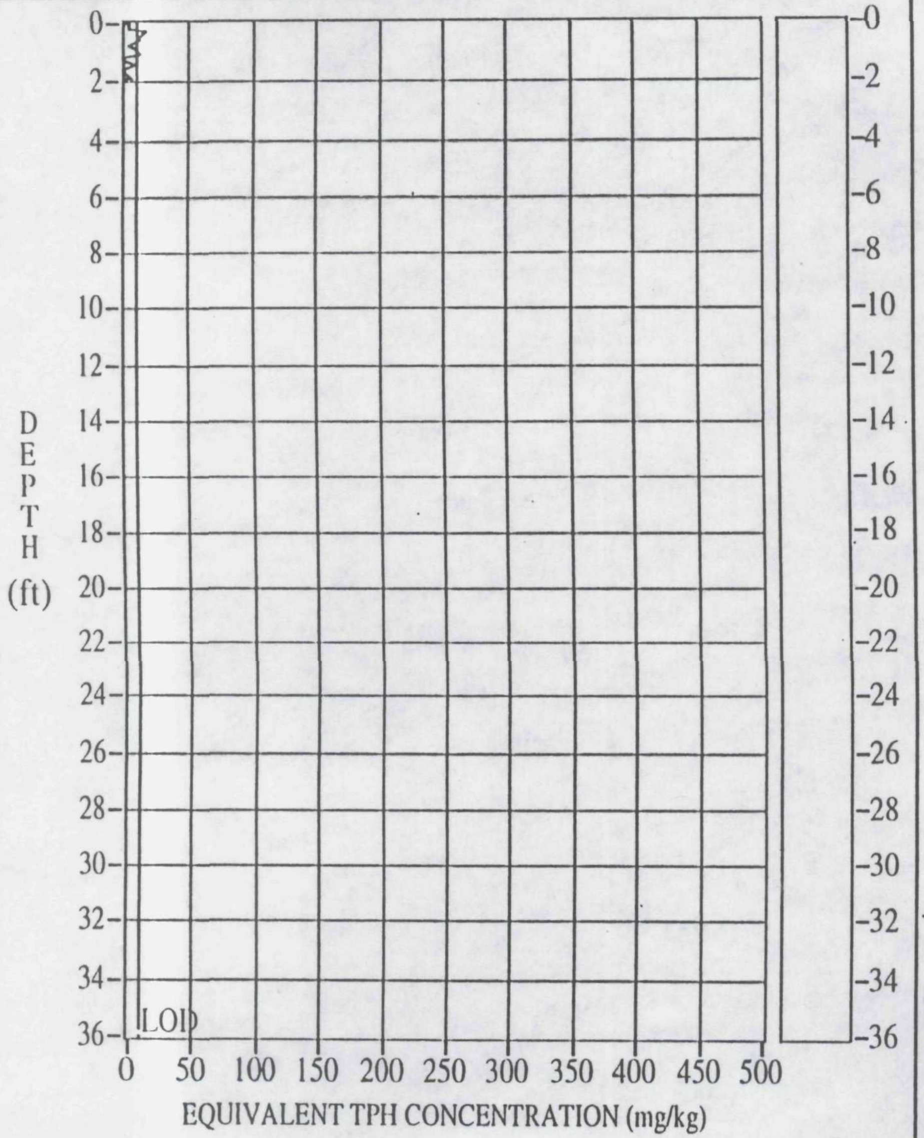
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP025A



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
14	0.32	283.00	380.00

Undefined
Peat
Clay
Clay & Silt
Silt
Sand & Silt
Sand

Date: 12/14/95	Geraghty & Miller, Inc.
Proj. No.: HA73	Sylvan Slough, Rock Island, Illinois
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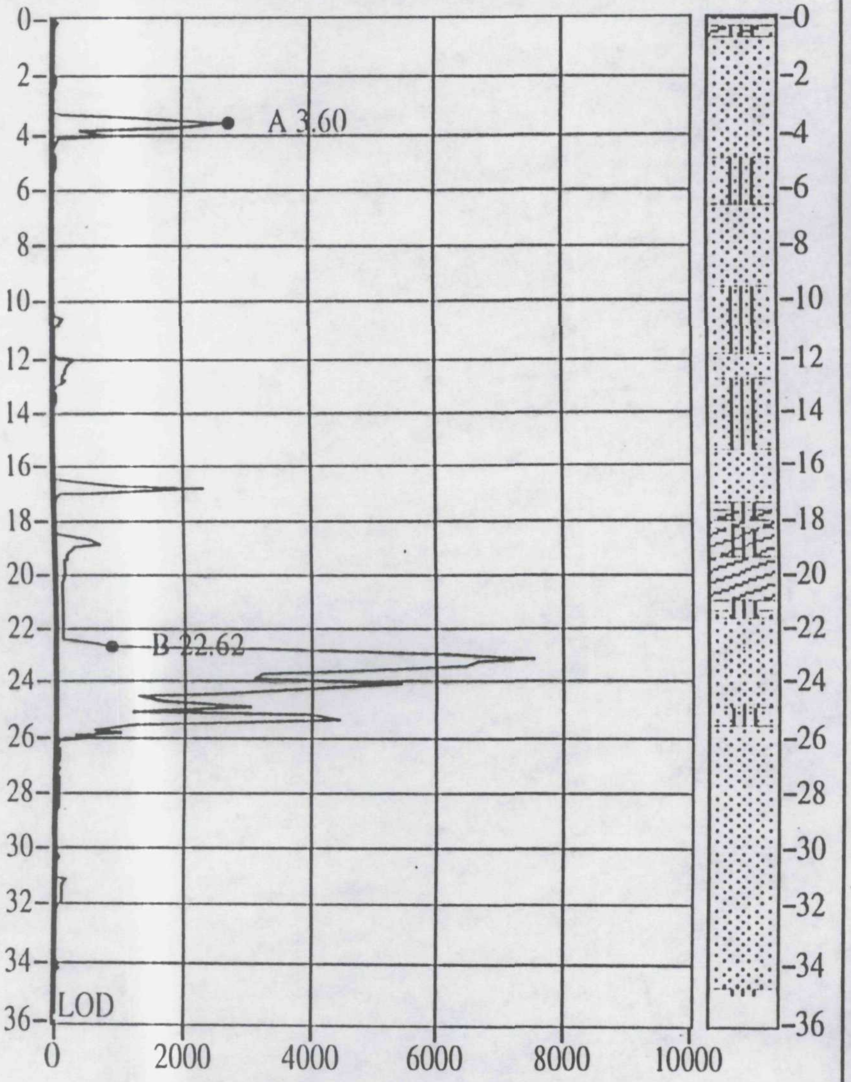
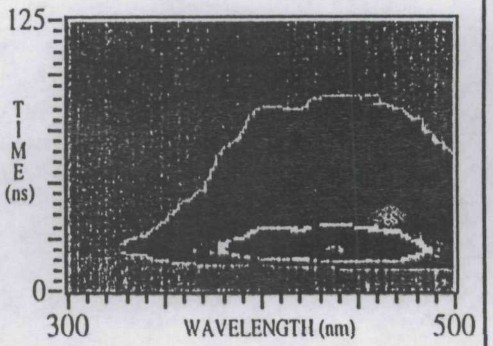
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP028



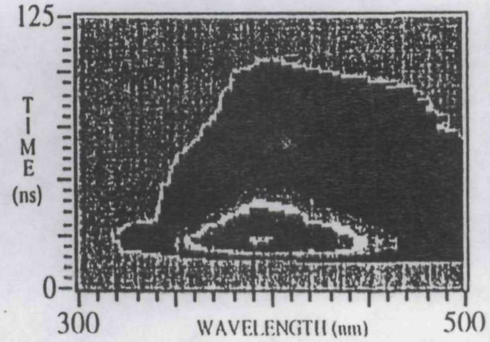
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
7520	23.08	283.00	380.00

A WTM ID : WCP028A

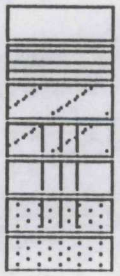


Peak Signal	0.325581 @ 440.00
FVD Signal	0.178715 @ 380.00

B WTM ID : WCP028B



Peak Signal	0.084347 @ 390.00
FVD Signal	0.068889 @ 380.00



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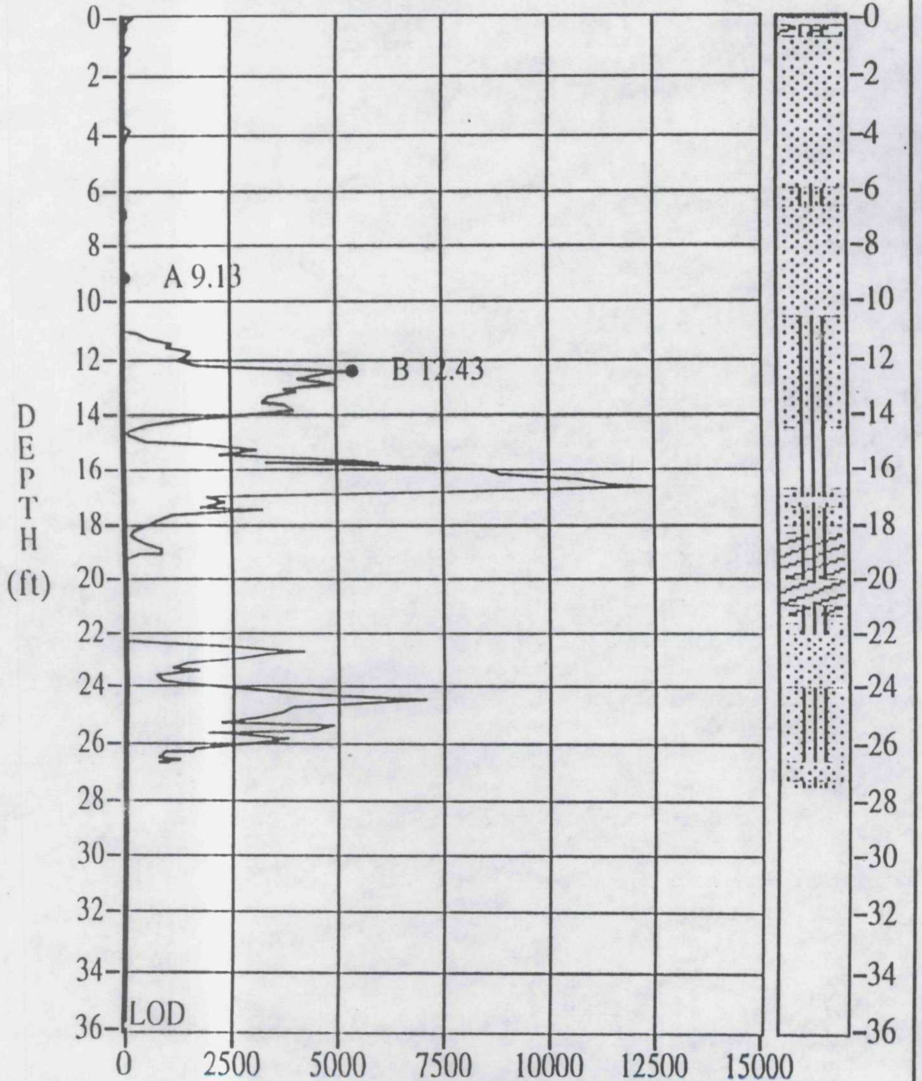
INTEGRATED ROST/CPT DATA LOG

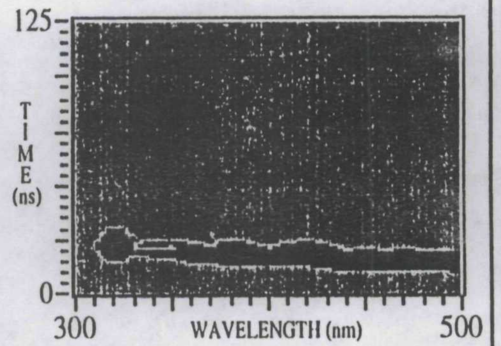
FVD ID : CP030



EQUIVALENT TPH CONCENTRATION (mg/kg)

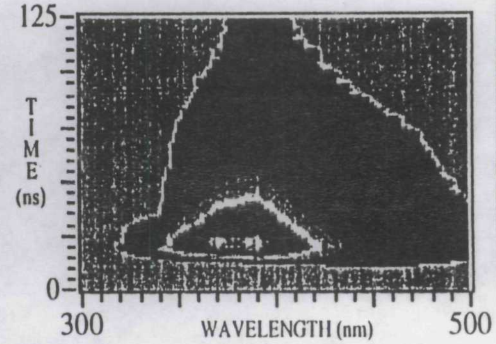
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
12498	16.67	283.00	380.00

A WTM ID : WCP030A

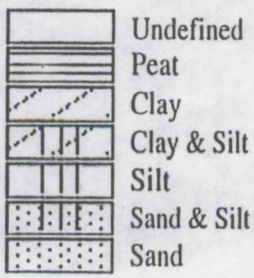


Peak Signal 0.002445 @ 320.00
FVD Signal 0.001512 @ 380.00

B WTM ID : WCP030B



Peak Signal 0.238826 @ 390.00
FVD Signal 0.222985 @ 380.00



Date: 12/14/95	Geraghty & Miller, Inc.
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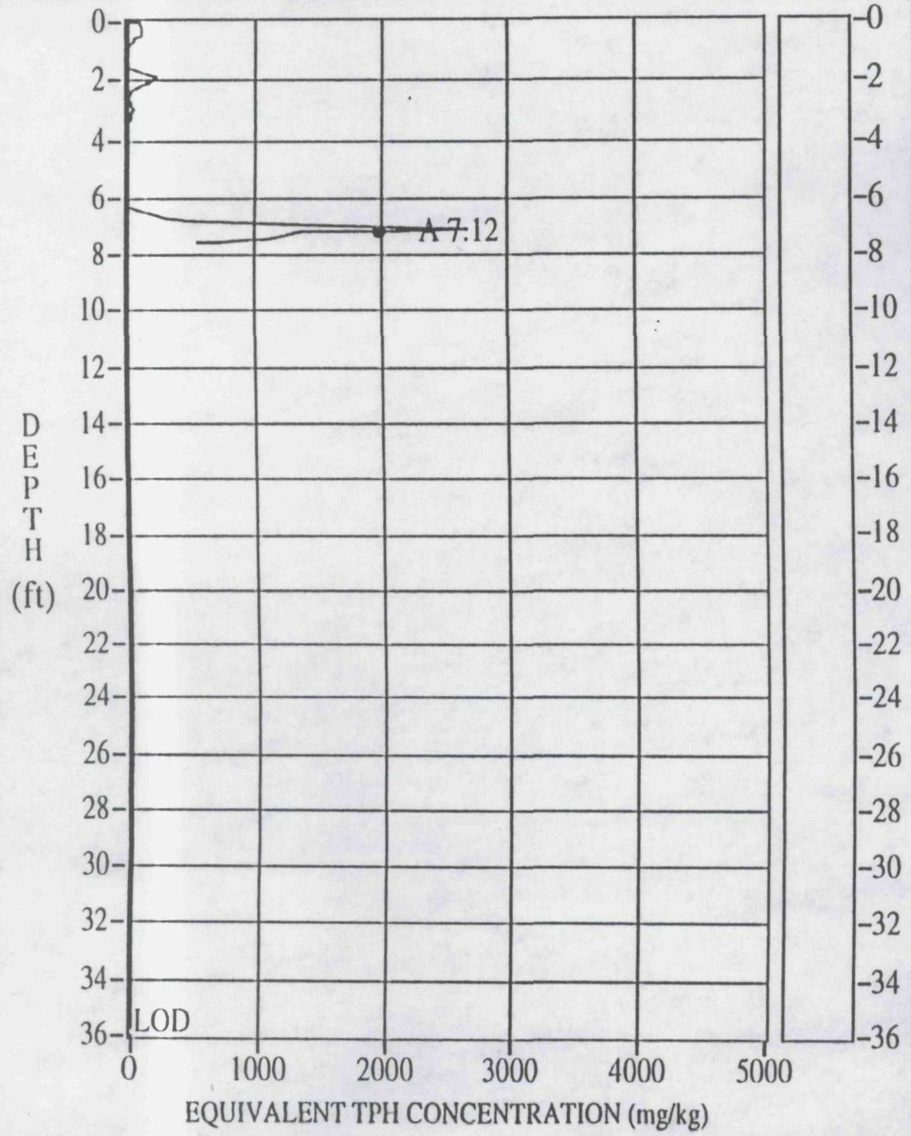
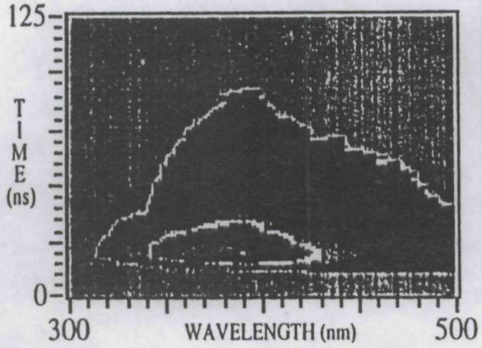
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP031



Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
2673	7.03	283.00	380.00

A WTM ID : WCP031A



Peak Signal 0.076968 @ 390.00
FVD Signal 0.071992 @ 380.00

- Undefined
- Peat
- Clay
- Clay & Silt
- Silt
- Sand & Silt
- Sand

Date: 12/14/95	Geraghty & Miller, Inc.
Proj. No.: HA73	Sylvan Slough, Rock Island, Illinois
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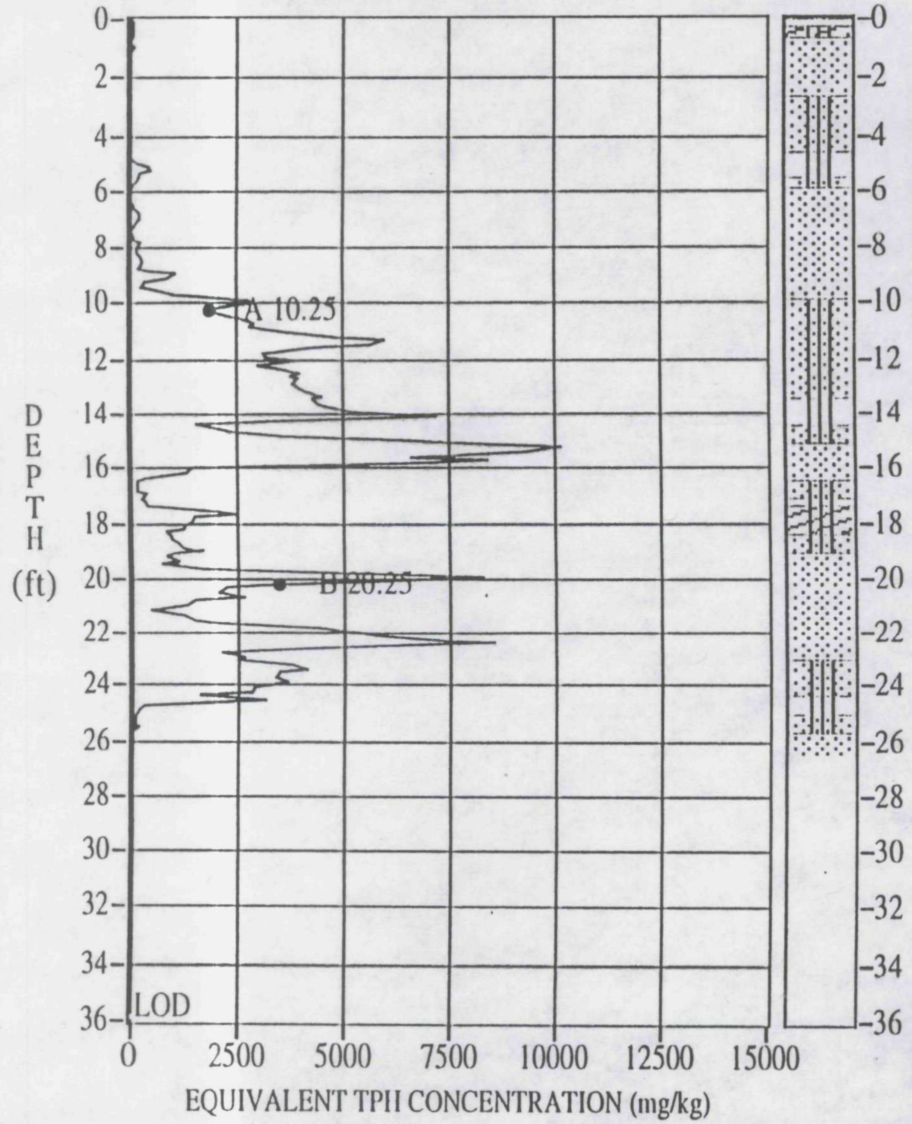
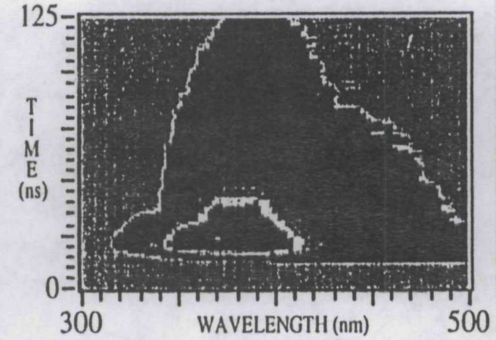
INTEGRATED ROST/CPT DATA LOG

FVD ID : CP031A



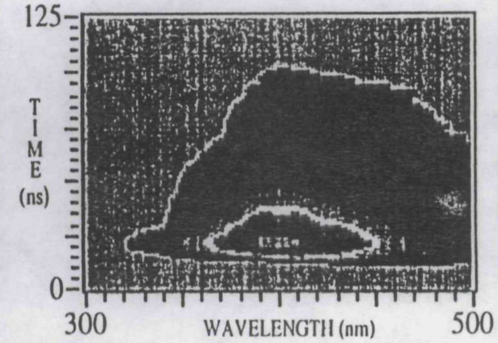
Max mg/kg	@ Depth (ft)	Excitation λ	Emission λ
10141	15.27	283.00	380.00

A WTM ID : WCP031AA

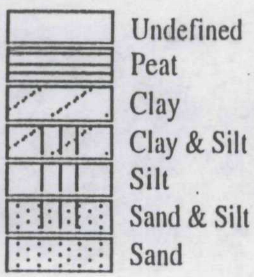


Peak Signal	0.062871 @ 370.00
FVD Signal	0.056265 @ 380.00

B WTM ID : WCP031AB



Peak Signal	0.167768 @ 400.00
FVD Signal	0.126840 @ 380.00



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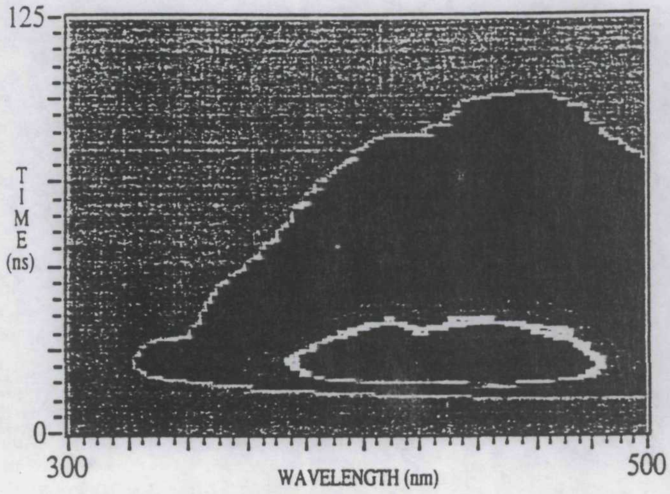
APPENDIX B

WTMS OF CORRELATION SAMPLES

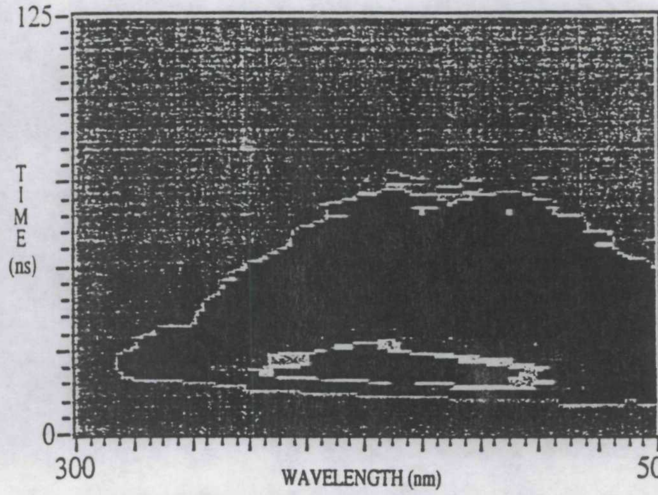
WTM REPORT

A WTM ID: C0623A



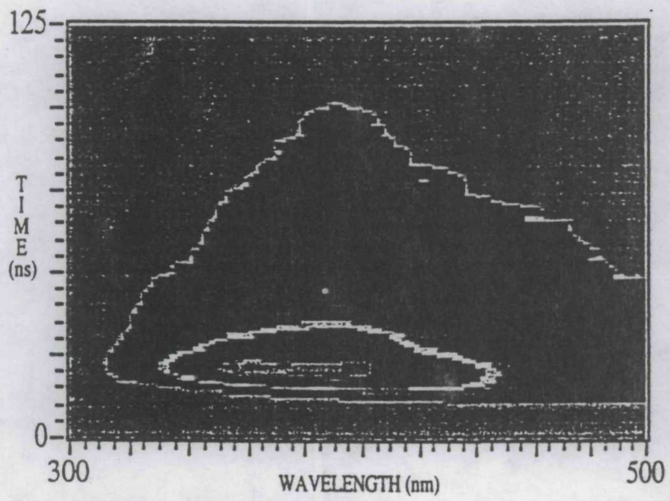
Peak Signal (V) 0.254316 @ 410.00
Intensity (%) 66.48 @ 380.00

B WTM ID: C0720A



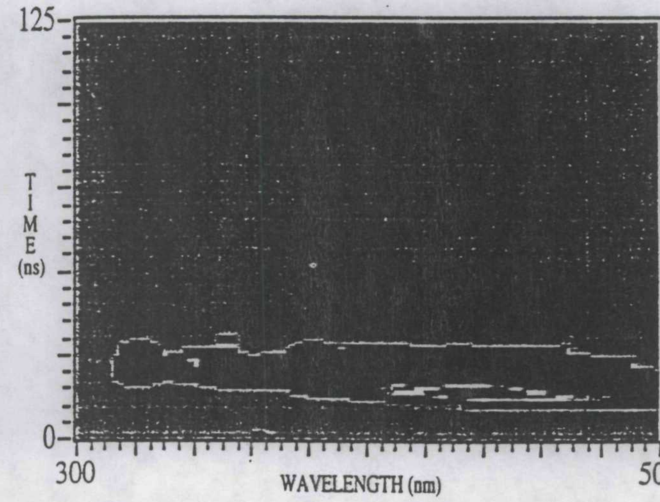
Peak Signal (V) 0.014225 @ 410.00
Intensity (%) 3.71 @ 380.00

C WTM ID: C07215A



Peak Signal (V) 0.139975 @ 360.00
Intensity (%) 56.59 @ 380.00

D WTM ID: C0823A



Peak Signal (V) 0.007114 @ 440.00
Intensity (%) 0.46 @ 380.00

Comments	
A	Sample CPT-6 (23'-24')
B	Sample CPT-7 (20'-21')
C	Sample CPT-7 (21.5'-22.5')
D	Sample CPT-8 (22.5'-23.5')

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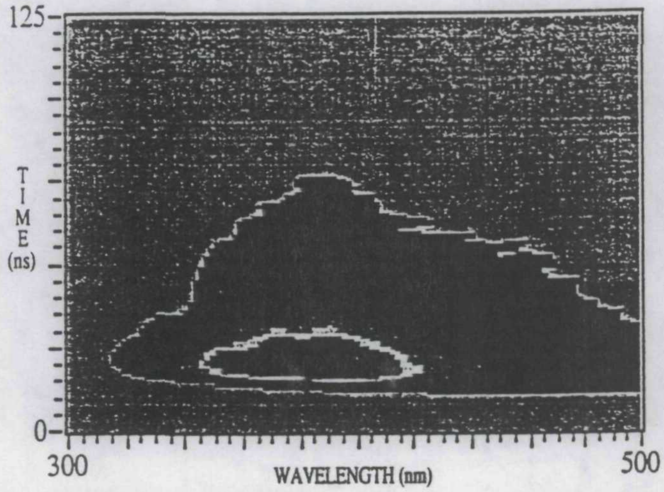
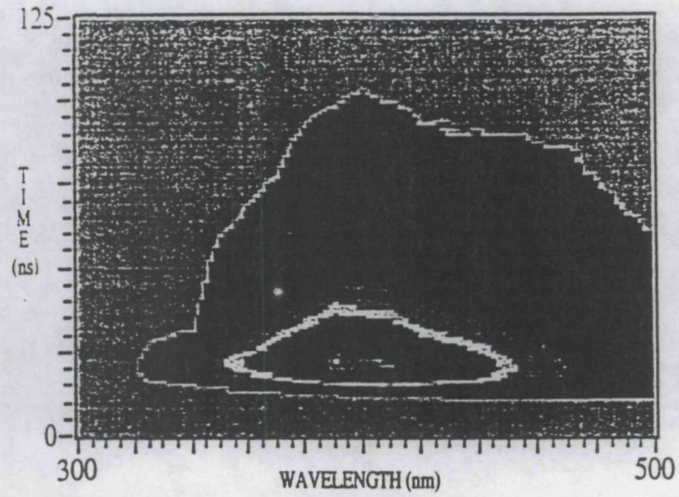
WTM REPORT

A WTM ID: C09238A



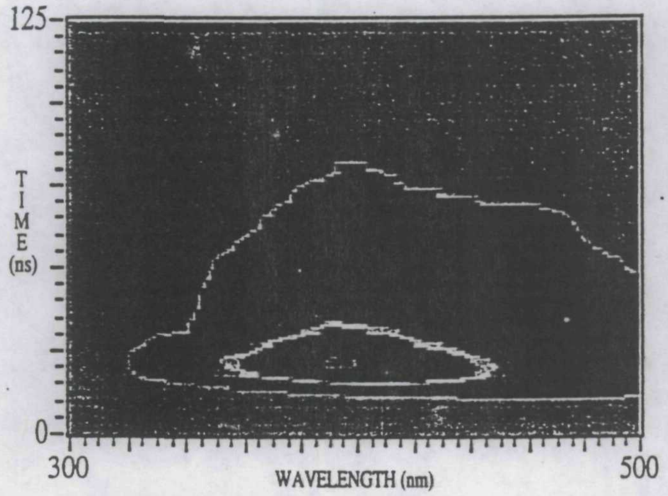
Peak Signal (V) 0.030837 @ 390.00
Intensity (%) 10.99 @ 380.00

B WTM ID: C10153A



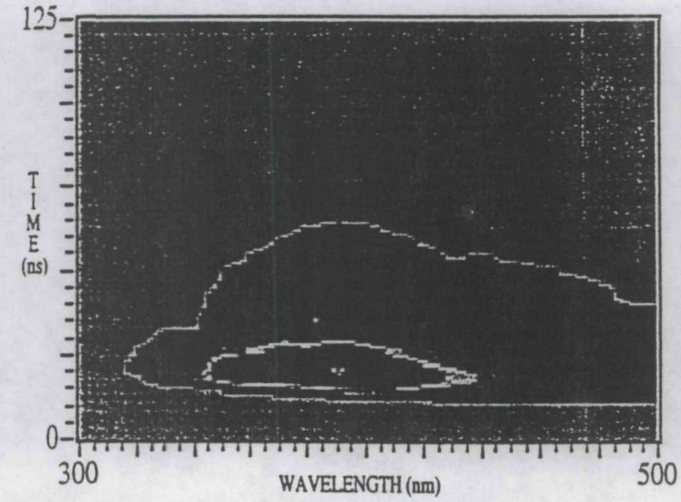
Peak Signal (V) 0.618350 @ 390.00
Intensity (%) 262.62 @ 380.00

C WTM ID: C1418A



Peak Signal (V) 0.244237 @ 390.00
Intensity (%) 72.97 @ 380.00

D WTM ID: C15175A



Peak Signal (V) 0.183912 @ 390.00
Intensity (%) 46.57 @ 380.00

Comments	
A	Sample CPT-9 (23.8'-24.8')
B	Sample CPT-10 (15.3'-16.3')
C	Sample CPT-14 (18'-19')
D	Sample CPT-15 (17.5'-18.5')

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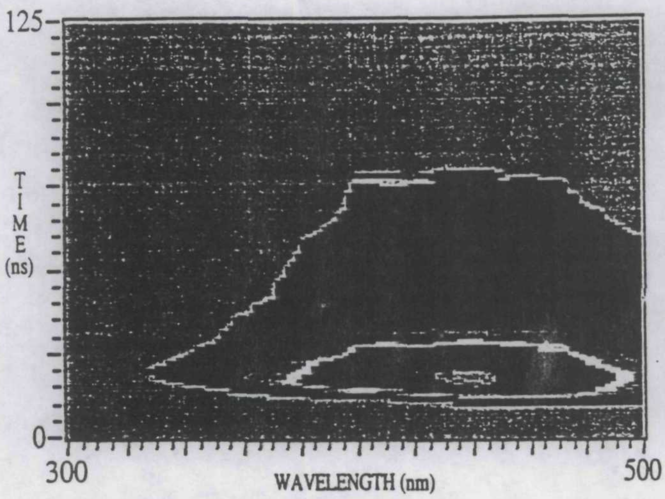
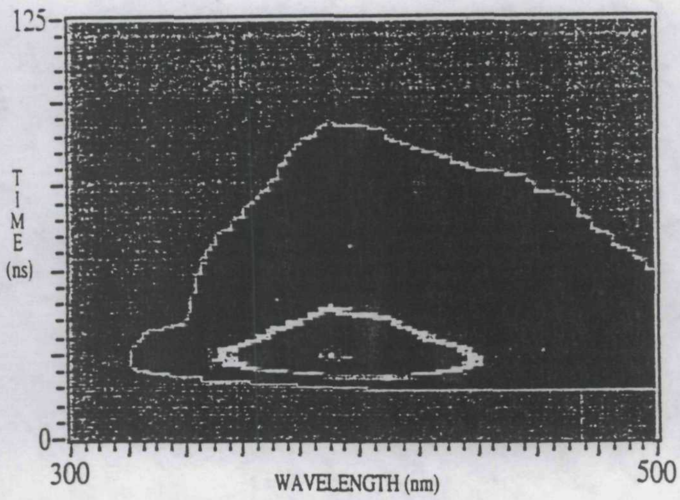
WTM REPORT

A WTM ID: C2823A



Peak Signal (V) 0.199207 @ 440.00
Intensity (%) 32.64 @ 380.00

B WTM ID: C3120A



Peak Signal (V) 0.525120 @ 390.00
Intensity (%) 174.98 @ 380.00

	Comments
A	Sample CPT-28 (23'-24')
B	Sample CPT-31 (20'-21')
C	
D	

Date: 12/15/95	Geraghty & Miller, Inc.
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APPENDIX B

ROST Fluorescence Data

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP001 Depth	CP001 Fluorescence	Potential Oil Thick (ft)	CP002 Depth	CP002 Fluorescence	Potential Oil Thick (ft)	CP003 Depth	CP003 Fluorescence	Potential Oil Thick (ft)	CP004 Depth	CP004 Fluorescence	Potential Oil Thick (ft)
0.0674	0.5862		0.1291	6.1928		0.0856	0.259		0.1146	0.3624	
0.1872	1.2486		0.2708	6.3381		0.2236	0.1263		0.2526	0.3829	
0.3144	0.9805		0.416	6.07		0.3543	0.2897		0.3834	0.4268	
0.4342	0.7568		0.5504	6.1835		0.4887	0.2671		0.525	0.3056	
0.5613	1.4192		0.6884	6.1369		0.6267	0.1702		0.6666	0.3441	
0.6848	1.2307		0.8192	5.4947		0.7611	0.4203		0.8047	0.3951	
0.8083	1.2085		0.9536	0.2692		0.8954	0.7242		0.9463	3.3185	
0.9318	0.8549		1.077	0.1357		1.0262	0.8942		1.0843	5.8424	
1.0516	0.7684		1.1969	0.0461		1.1606	0.8249		1.2332	5.5626	
1.1751	0.8111		1.324	0.0579		1.2949	0.5414		1.3785	11.373	
1.2986	0.5616		1.4584	-0.0128		1.4221	0.4317		1.5129	14.8661	
1.4221	0.4657		1.5928	0.0133		1.5528	0.4619		1.6545	11.8952	
1.5492	0.3448		1.7308	0.0402		1.6872	0.8077		1.7998	11.1868	
1.6763	0.101		1.8724	-0.0172		1.8216	1.4377		1.9414	11.243	
1.7961	0.3633		2.0068	0.1142		1.9596	0.9168		2.0831	5.994	
1.9341	0.1401		2.1121	-0.0422		2.0976	0.7763		2.2283	5.2485	
2.0685	0.1579		2.1266	-0.0392		2.2356	0.192		2.371	4.1122	
2.1993	0.0549		2.2646	-0.0202		2.3736	0.3389		2.5261	0.3816	
2.33	0.094		2.3954	0.1098		2.5189	0.0748		2.6859	0.1659	
2.4717	0.1788		2.5261	0.078		2.6605	0.4027		2.8421	0.4312	
2.606	0.1515		2.6605	-0.0677		2.7913	1.0466		2.8748	-0.0049	
2.744	0.2016		2.7985	-0.0271		2.9002	1.1051		2.8857	0.037	
2.8167	0.1412		2.9365	0.1667		3.0491	0.6234		3.0346	0.2054	
2.8603	0.2177		3.0782	0.059		3.1908	0.2662		3.1871	2.0749	
3.0092	0.2572		3.2198	-0.0095		3.3397	0.2193		3.3324	0.8782	
3.1472	0.1694		3.3615	-0.0804		3.4922	0.0389		3.4777	0.7118	
3.2961	0.2191		3.4886	0.0094		3.6338	0.0085		3.6302	0.2554	
3.4414	0.1672		3.6121	-0.04		3.7864	-0.0385		3.7755	0.1578	
3.583	0.1066		3.7319	-0.0586		3.9353	-0.0157		3.9244	0.1971	
3.7246	0.0677		3.859	-0.0287		4.0806	0.0683		4.0733	0.4107	
3.8772	0.157		3.9898	0.052		4.2258	0.0556		4.2258	1.755	
4.0188	0.0503		4.1132	-0.0282		4.382	-0.0228		4.3711	0.6666	
4.1714	-0.0564		4.2476	-0.0807		4.5273	-0.0281		4.5273	0.4466	
4.3239	0.0201		4.3747	-0.0674		4.6798	0.0407		4.6725	0.228	
4.4764	-0.0213		4.5091	-0.0966		4.8287	-0.0096		4.8251	0.1644	
4.6072	-0.0269		4.6399	-0.0849		4.9812	0.0129		4.974	0.0951	
4.7307	-0.0265		4.7706	0.011		5.1302	-0.0259		5.1265	0.0651	
4.8396	-0.0565		4.8905	0.0602		5.2827	-0.0002		5.2718	-0.0098	
4.9558	-0.0297		5.0139	0.0529		5.4316	-0.0112		5.4243	0.6051	
5.0757	-0.0505		5.1374	-0.0651		5.5769	0.0192		5.5769	0.0423	
5.2064	0.0164		5.2573	0.1899		5.733	0.0109		5.7185	-0.0539	
5.3408	-0.0085		5.3699	0.7045		5.8783	-0.0826		5.871	-0.0191	
5.4715	-0.0121		5.4316	0.9583		6.0272	-0.0603		6.0163	-0.0518	
5.6096	0.0415		5.4715	0.8403		6.1035	-0.0719		6.0926	-0.0652	
5.7439	0.024		5.5551	0.929		6.2088	-0.0196		6.2088	0.0023	
5.8747	5.2869		5.5878	0.9904		6.3468	-0.0539		6.325	-0.002	
6.0091	4.2048		5.7185	0.3667		6.4739	-0.0687		6.3432	-0.0651	
6.0744	2.5975		5.98	2.7128		6.6119	0.0134		6.4558	-0.1194	
6.118	1.0941		6.0163	1.1004		6.7463	-0.0313		6.572	-0.0457	
6.1689	1.0921		6.02	0.6872		6.8771	-0.0906		6.6918	-0.0827	
6.3032	0.9282		6.1507	1.3519		7.0042	0.0006		6.819	-0.1221	
6.4376	0.0415		6.2851	1.2908		7.1313	-0.0107		6.9461	-0.1336	
6.5756	0.2421		6.4195	1.3192		7.2584	-0.022		7.0732	-0.0453	
6.7173	0.6595		6.5575	0.108		7.3674	-0.041		7.1749	-0.113	
6.8407	0.8431		6.6809	-0.0389		7.4908	-0.0228		7.2076	-0.0627	
6.9388	0.3004		6.71	0.0235		7.6216	-0.0684		7.2838	-0.0655	
7.0804	0.1133		6.7499	0.2288		7.7523	-0.0288		7.4037	0.0794	
7.2221	0.0845		6.8916	0.8626		7.8831	0.1284		7.4509	0.3057	
7.3601	0.0319		7.0332	1.1821		8.0247	-0.0849		7.4872	0.8492	
7.4981	0.0599		7.1313	0.3665		8.1555	-0.0716		7.5671	1.086	
7.6506	0.1767		7.2402	0.0431		8.2935	-0.0354		7.6325	3.1074	
7.7887	0.1614		7.3891	0.0268		8.4351	0.0028		7.6506	2.853	
7.9339	0.1325		7.5308	0.0159		8.584	0.0847		7.6906	1.5537	
8.0756	0.2014		7.6724	0.102		8.722	0.0642		7.7741	0.689	
8.2245	0.1244		7.8213	0.2717		8.8637	0.2952		7.8685	1.0613	
8.3697	0.0685		7.9521	1.3769		9.0053	1.1261		7.9775	0.5581	
8.515	0.0242		8.0865	0.1988		9.1542	2.6039		8.101	0.5092	
8.6639	0.0798		8.2281	-0.0208		9.2959	0.642		8.2317	0.4654	
8.8056	0.0311		8.2935	0.1196		9.3939	0.0836		8.3625	1.1508	
8.9581	-0.0136		8.3516	-0.0171		9.423	0.1754		8.5005	1.9339	
9.1034	-0.0324		8.4932	0.127		9.5682	0.1039		8.6276	1.9468	
9.2523	-0.011		8.6385	-0.026		9.7135	2.4759		8.7583	1.5816	
9.3975	-0.0851		8.722	0.046		9.8588	6.0771		8.8818	5.1056	
9.4121	-0.0338		8.7983	0.0139		10.0077	5.0432		9.0126	4.8421	
9.5138	-0.0219		8.9218	-0.0361		10.153	8.5885		9.147	18.0676	
9.6699	-0.0429		8.9726	-0.067		10.3055	6.521		9.2741	25.5682	
9.8152	-0.0974		9.1034	-0.0779		10.429	1.5987		9.3939	12.7386	
9.9714	-0.004		9.2341	-0.0045		10.5016	1.5218		9.5465	14.4154	
10.1166	0.011		9.3068	-0.0634		10.6505	2.0131		9.7063	0.8657	
10.2656	-0.0011		9.4375	-0.083		10.7958	6.0604		9.8552	1.0154	
10.4181	-0.0214		9.5755	0.8343		10.9556	8.1472		10.0113	0.4597	
10.567	-0.0181		9.7135	-0.0119		11.119	7.9963		10.1566	0.0697	
10.7123	-0.0372		9.7317	0.0916		11.2716	8.9275		10.3019	-0.0067	
10.8648	0.0127		9.8043	1.944		11.4314	13.7857		10.4471	-0.0089	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP001 Depth	CP001 Fluorescence	Potential Oil Thick (ft)	CP002 Depth	CP002 Fluorescence	Potential Oil Thick (ft)	CP003 Depth	CP003 Fluorescence	Potential Oil Thick (ft)	CP004 Depth	CP004 Fluorescence	Potential Oil Thick (ft)
11.0101	0.0196		9.9387	2.1798		11.5766	17.4715		10.5888	0.2322	
11.1554	0.0096		10.084	0.9918		11.7328	16.2509		10.7377	0.5046	
11.3079	0.0153		10.2256	2.2979		11.8636	17.5862		10.883	0.3796	
11.3152	-0.0019		10.3636	2.1442		12.0161	23.6089		11.0246	0.5045	
11.435	-0.0114		10.5089	4.364		12.165	21.4149		11.1336	0.5124	
11.5803	-0.0103		10.6542	7.9348		12.3248	23.4394		11.2498	0.487	
11.7292	-0.0179		10.7558	10.8274		12.4773	20.2152		11.2716	0.6248	
11.8781	0.0061		10.7885	11.5308		12.6262	32.1863		11.3188	0.3684	
12.0197	-0.0069		10.9302	4.6336		12.688	38.836		11.4568	0.4394	
12.1759	-0.0149		11.0754	7.0181		12.7134	33.0291		11.6093	0.5239	
12.3212	0.006		11.2171	5.0203		12.8623	46.9056		11.7546	0.4149	
12.4737	-0.0138		11.366	0.8974		13.0112	51.2272		11.9708	0.3147	
12.619	-0.0415		11.5258	0.2033		13.1601	56.8586		12.0524	0.0655	
12.717	-0.0131		11.6711	0.3464		13.3163	69.0236		12.2049	1.055	
12.7279	-0.0354		11.8163	0.3677		13.4616	68.4777		12.3575	2.4324	
12.8768	-0.023		11.9616	0.2046		13.6105	76.1695		12.5064	1.2681	
13.0294	-0.009		12.0197	0.1375		13.763	80.5533		12.5645	1.0609	
13.1783	-0.0237		12.1287	0.195		13.9192	100.1531		12.6553	0.7541	
13.3308	-0.0453		12.2776	0.6298		14.0826	107.2802		12.8078	0.044	
13.4797	-0.063		12.4265	0.1485		14.2388	100.4267		12.9604	0.2754	
13.625	-0.0199		12.5718	0.1367		14.3913	96.3579		13.1093	0.1735	
13.7703	-0.008		12.717	0.1483		14.5402	101.1813		13.2582	0.0704	
13.9192	-0.069		12.8623	0.0405		14.6964	105.4506		13.4071	0.0382	
14.0753	-0.0271		13.0076	0.0639		14.8417	109.4156		13.5415	0.0465	
14.217	-0.0481		13.1565	0.1041		14.9906	101.8661		13.6831	0.0554	
14.3659	-0.0078		13.3054	0.0234		15.1467	148.2867		13.8247	0.0514	
14.5148	0.003		13.4543	-0.0316		15.2956	162.3976		13.9591	0.024	
14.6601	-0.0223		13.5959	-0.0192		15.4482	148.4391		14.0608	0.0218	
14.8126	-0.0397		13.7412	-0.0424		15.608	138.6601		14.2315	0.0634	
14.9615	0.0142		13.8901	0.029		15.7569	141.5161		14.3731	1.3993	
15.1068	1.0427		14.0281	-0.0291		15.9167	121.669		14.5112	11.6202	
15.2557	13.5007		14.1807	0.0792		15.953	132.3116		14.6492	23.3183	
15.3646	19.5719		14.3296	0.1175		16.0256	132.7421		14.809	83.1278	
15.4554	69.94		14.4712	0.128		16.1709	129.8942		14.9542	103.6133	
15.4663	67.2454		14.6092	0.1014		16.3234	119.7843		15.0886	21.5729	
16.0547	64.1917		14.7509	0.1222		16.4832	54.3196		15.2375	5.3307	
16.1273	61.7334		14.8961	-0.0044		16.6467	41.88		15.3901	48.6706	
16.1309	58.2499		15.0414	0.0029		16.8101	14.8366		15.5317	75.211	
16.2072	65.9714		15.1903	0.0472		16.9735	15.2481		15.6915	88.6027	
16.3634	76.5644		15.3211	0.0666		17.1297	15.8603		15.8368	120.2969	
16.5232	95.4536		15.4191	0.0154		17.2713	17.8684		15.8695	141.412	
16.683	100.0852		15.568	0.0963		17.4311	17.7029		15.8731	250.3107	0.00
16.8428	108.3394		15.7133	-0.0031		17.5837	19.9298		16.022	146.5719	
16.9009	118.6117		15.8622	0.0653		17.7362	7.3899		16.1782	158.0948	
16.9953	121.3478		16.0002	0.2271		17.9033	1.6275		16.3343	174.8977	
17.1515	124.0601		16.1564	0.2766		18.0631	1.2008		16.4578	159.0241	
17.3222	96.2153		16.3016	0.0181		18.212	1.426		16.6503	102.0648	
17.482	134.1388		16.4469	0.0391		18.3645	3.13		16.8065	178.4931	
17.6454	126.4687		16.5958	0.0549		18.4226	3.2547		16.9735	171.9844	
17.8089	129.9944		16.7484	0.0586		18.5171	2.5227		17.1479	223.6456	
17.9723	121.9154		16.8936	0.243		18.6732	0.7604		17.3113	156.8473	
18.1285	106.8113		17.0389	0.1616		18.8294	0.5037		17.4711	148.4452	
18.2883	81.1441		17.1842	0.2219		18.9747	7.226		17.6273	171.6515	
18.4408	105.1199		17.3331	0.2008		19.1308	1.5764		17.7907	139.582	
18.5897	40.7468		17.482	0.2557		19.2688	0.6799		17.9541	135.4468	
18.7459	14.1438		17.6273	0.3393		19.3342	0.3544		18.1321	121.0414	
18.9238	27.4066		17.7689	0.339		19.4831	0.4751		18.2556	97.7783	
19.0691	34.7691		17.9105	0.315		19.632	0.3803		18.4408	279.3578	0.19
19.2216	69.4734		18.0558	0.3775		19.7882	0.2568		18.6296	127.1765	
19.3742	55.2712		18.2011	0.4029		19.9335	0.2104		18.8112	133.3934	
19.4795	65.6143		18.3536	0.3019		20.0896	0.1257		18.9819	109.4491	
19.4831	65.2991		18.5025	0.1563		20.2385	0.0771		19.0945	100.0207	
19.603	93.1227		18.5134	0.2771		20.3838	0.0522		19.2543	75.0614	
19.7555	62.6805		18.5171	0.2287		20.5327	0.0772		19.4323	72.695	
19.9117	37.8235		18.5207	0.2657		20.6816	0.2943		19.603	31.6858	
20.0678	83.991		18.6224	0.2026		20.8342	0.3434		19.7955	30.6234	
20.2349	109.3155		18.7677	0.2411		20.9903	0.3182		19.9662	15.074	
20.3947	52.0677		18.9166	0.192		21.1392	0.3241		20.1477	26.1646	
20.5509	20.2448		19.0655	0.3595		21.2954	0.2773		20.3257	20.8201	
20.7361	36.0582		19.2107	1.0778		21.4516	0.2494		20.4891	12.2858	
20.8959	27.3234		19.3596	0.6029		21.6077	0.4198		20.6598	5.7355	
21.0557	6.3104		19.5085	0.3678		21.7603	0.2869		20.8342	2.6737	
21.2373	1.946		19.6538	1.5465		21.9056	0.294		21.0121	1.5972	
21.4189	2.9636		19.8027	6.2442		22.0617	0.2787		21.1719	12.6769	
21.6005	0.478		19.9516	4.9286		22.2143	0.2644		21.3317	16.8817	
21.7639	0.5617		20.1005	2.3223		22.3668	0.2067		21.5024	18.7825	
21.9273	0.4507		20.2422	2.4216		22.5193	0.3643		21.6622	18.6609	
22.098	0.5209		20.3947	6.3001		22.5738	0.3589		21.8293	19.8221	
22.2724	0.4898		20.5327	7.595		22.7009	0.5494		21.9891	15.3784	
22.4285	0.5402		20.5727	9.1811		22.8535	0.7661		22.1489	5.7087	
22.5847	0.463		20.7397	11.4768		23.0133	0.6484		22.3123	9.7247	
22.759	0.4437		20.8995	11.9852		23.1658	0.8439		22.414	7.133	
22.7953	0.4217		21.0557	7.3959		23.3147	0.7246		22.5484	24.193	
22.9624	0.4466		21.2119	2.6088		23.4636	0.7675		22.7118	18.2258	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP001 Depth	CP001 Fluorescence	Potential Oil Thick (ft)	CP002 Depth	CP002 Fluorescence	Potential Oil Thick (ft)	CP003 Depth	CP003 Fluorescence	Potential Oil Thick (ft)	CP004 Depth	CP004 Fluorescence	Potential Oil Thick (ft)
23.1295	0.4257		21.3898	1.5532		23.6161	0.7058		22.8861	23.3367	
23.3002	0.4321		21.5387	1.264		23.7687	0.6755		23.0387	49.2271	
23.4709	0.8465		21.6913	2.043		23.9212	0.643		23.1948	42.699	
23.6307	0.7562		21.8111	1.8905		24.0629	0.783		23.351	34.2187	
23.805	0.7963		21.8511	1.4119		24.2118	0.5946		23.4927	28.2468	
23.9793	0.7529		21.8656	1.1318		24.3607	0.7332		23.6379	47.5966	
24.1428	0.7992		22.0218	0.7281		24.5059	0.7729		23.7868	21.5475	
24.2953	0.7738		22.1743	13.5898		24.6476	0.5982		23.9394	14.8536	
24.4515	0.7896		22.3305	26.9544		24.7965	0.7402		24.0955	35.4342	
24.6294	0.8163		22.5012	124.8409		24.949	0.6643		24.2481	22.1268	
24.782	0.7648		22.5266	231.2217		25.0979	0.7263		24.4115	6.3122	
24.92	0.7404		22.6464	199.8547	0.15	25.2577	0.855		24.5967	8.3908	
25.1233	0.8225		22.7953	172.2182		25.3994	0.7178		24.7493	8.0797	
25.2759	0.7847		22.8062	168.0554		25.5337	0.9758		24.9272	10.544	
25.4357	0.5936		22.9297	170.3224		25.6681	0.9913		25.087	11.9471	
25.5846	0.3243		23.0786	168.853		25.8061	6.5665		25.2577	14.5582	
25.6064	0.3716		23.2312	141.5039		25.886	9.9581		25.4103	12.9798	
25.6173	0.9432		23.3764	104.2		26.0277	33.2287		25.5701	6.6515	
25.7698	0.5027		23.5326	42.8379		26.1911	12.765		25.7044	5.0943	
25.9223	0.8464		23.7142	13.5827		26.3509	13.1526		25.8424	3.5197	
26.0821	0.7925		23.8885	4.8203		26.4889	11.1456		25.9986	0.7911	
26.1112	0.6958		24.0665	5.3758		26.6306	21.6439		26.1439	0.3978	
26.2129	0.5147		24.2299	5.4167		26.7649	22.9695		26.2892	0.2071	
26.3691	0.3801		24.3752	5.3728		26.8703	48.8695		26.4381	0.1816	
26.5216	0.4521		24.5423	4.875		26.9066	45.4052		26.5833	0.1789	
26.6814	0.5253		24.6948	5.9372		27.0591	54.2641		26.725	0.1829	
26.8485	0.574		24.851	7.823		27.1753	117.0896		26.8594	1.4989	
27.0119	0.7019		25.0035	3.8811		27.2298	39.7998		26.9647	7.6144	
27.1717	2.1914		25.1342	2.3738		27.3751	51.2626		26.9901	11.0829	
27.3279	3.5002		25.2759	2.0086		27.524	19.7115		27.0664	15.4455	
27.4949	5.442		25.4466	1.2116		27.6729	13.7823		27.1644	20.7399	
27.6475	2.5634		25.61	0.8493		27.8254	11.4306				
27.8073	1.8015		25.7625	0.9454		27.9925	21.3316				
27.9671	1.3268		25.9332	1.8198		28.145	21.1294				
28.1269	0.8767		26.093	2.0116		28.2903	29.0345				
28.2903	0.8138		26.2311	2.2111		28.4392	35.4618				
28.4574	0.7039		26.3691	1.607		28.5917	17.5689				
28.6281	0.8455		26.5034	1.1674		28.737	16.0972				
28.8024	0.973		26.6306	0.8925		28.8932	24.3388				
28.9549	1.0595		26.7613	0.9944		29.013	46.5				
29.1147	1.1519		26.8884	0.4353		29.0602	79.0537				
29.2854	0.7578		27.0264	0.3245		29.2091	73.9345				
29.4271	0.353		27.1572	0.1962		29.3689	20.8308				
29.4416	0.3372		27.2879	0.3011		29.5542	6.7846				
29.5941	0.3657		27.4041	0.2003		29.7358	3.9125				
29.605	0.2655		27.455	0.2158		29.9028	8.1307				
29.6086	0.2778					30.0517	8.8605				
29.6595	0.3344					30.197	11.6057				
29.8302	0.2436					30.3495	13.571				
29.99	0.4419					30.4984	11.9518				
30.1498	0.4637					30.6437	6.9699				
30.3278	0.6088					30.7999	5.8141				
30.4803	0.5063					30.9016	3.3694				
30.6401	0.3837										
30.8071	0.2765										
30.9524	0.3116										
31.1159	0.3893										
31.2648	0.4192										
31.4173	0.4559										
31.5553	0.2805										
31.7151	0.3141										
31.8785	0.3709										
32.0383	0.3158										
32.1836	0.4266										
32.3216	0.4666										
32.456	0.7607										
32.5976	0.6187										
32.6267	0.5922										
32.663	0.5386										
32.7102	0.9349										
32.7647	1.6567										
32.9063	0.9941										
33.0298	0.4192										
33.1569	0.4112										
33.2949	0.6889										
33.4112	0.6661										
33.5383	0.6834										
33.5746	0.8544										
33.6836	0.7872										

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP001 Depth	CP001 Fluorescence	Potential Oil Thick (ft)	CP002 Depth	CP002 Fluorescence	Potential Oil Thick (ft)	CP003 Depth	CP003 Fluorescence	Potential Oil Thick (ft)	CP004 Depth	CP004 Fluorescence	Potential Oil Thick (ft)

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP005 Depth	CP005 Fluorescence	Potential Oil Thick (ft)	CP006 Depth	CP006 Fluorescence	Potential Oil Thick (ft)	CP007 Depth	CP007 Fluorescence	Potential Oil Thick (ft)	CP007A Depth	CP007A Fluorescence	Potential Oil Thick (ft)
0.0565	0.3182		0.1218	0.3679		0.1013	0.7549		0.0207	0.4022	
0.1945	0.4865		0.2614	0.4589		0.1544	0.7256		0.1629	0.3178	
0.3253	0.4942		0.3975	0.3363		0.2473	0.8225		0.298	0.4919	
0.4669	0.6585		0.5371	0.3023		0.381	0.8401		0.4046	1.1171	
0.6049	0.7809		0.6732	0.4783		0.5126	1.0259		0.5467	0.6029	
0.7356	0.4637		0.8129	0.3272		0.6387	0.2862		0.6818	0.2691	
0.87	1.3359		0.9489	0.1754		0.7681	0.7422		0.8169	0.2249	
1.0117	0.9687		1.085	0.2609		0.8974	0.5266		0.959	0.2294	
1.1424	1.6605		1.2175	0.3596		1.0268	0.2011		1.0941	0.2338	
1.2768	1.4944		1.3535	0.0612		1.1628	0.2192		1.221	0.1828	
1.4112	1.0416		1.4968	0.0922		1.2955	0.2354		1.35	0.2172	
1.5455	0.4848		1.6328	0.0443		1.4249	0.1172		1.485	0.2174	
1.6763	0.5745		1.7689	-0.0197		1.5609	0.2331		1.613	0.2389	
1.8107	0.6307		1.905	0.0276		1.6903	0.1527		1.7516	0.1373	
1.9487	0.0823		2.0375	-0.0339		1.8229	0.1365		1.8937	-0.0077	
2.0867	-0.0638		2.1807	-0.021		1.9523	0.1648		2.0324	0.0141	
2.2174	-0.1375		2.3203	-0.0303		2.0817	0.2014		2.1639	-0.0188	
2.3591	-0.0362		2.4528	0.0076		2.2111	0.117		2.3025	-0.0052	
2.4934	-0.0887		2.5925	-0.0482		2.3437	0.1705		2.4375	0.0411	
2.6278	-0.045		2.6712	0.0068		2.4764	0.1129		2.5726	0.0098	
2.7622	-0.0335		2.7894	0.0308		2.6158	0.2422		2.7112	0.0825	
2.8203	0.0016		2.9291	-0.0094		2.7518	0.1363		2.8462	-0.0187	
2.9002	-0.055		3.0687	-0.0428		2.8811	0.1166		2.9031	0.0744	
3.0164	0.018		3.2119	-0.0258		3.0072	0.1407		2.9138	-0.0295	
3.1254	0.1966		3.3516	0.0528		3.1399	0.088		2.9244	0.0303	
3.238	0.0149		3.4876	-0.0247		3.173	0.0325		3.0275	0.031	
3.3469	-0.0682		3.6309	-0.0019		3.256	0.0677		3.2017	0.0274	
3.4523	-0.063		3.7669	-0.0786		3.3787	-0.0135		3.3403	0.0381	
3.4631	-0.0227		3.8958	-0.009		3.518	0.0304		3.4718	0.0248	
3.5249	-0.0778		4.0212	0.0044		3.6441	0.0575		3.6104	0.0591	
3.6375	0.1192		4.1537	-0.1141		3.7701	-0.0173		3.7383	0.0498	
3.7464	-0.0336		4.2897	-0.1682		3.8995	-0.0542		3.8734	-0.021	
3.8554	-0.1156		4.4222	-0.0582		4.0289	0.0089		3.9978	-0.0615	
3.9643	-0.1538		4.5619	0.0194		4.1483	-0.0247		4.1328	0.0297	
4.0769	-0.0922		4.7015	0.0295		4.271	0.0632		4.2714	0.0064	
4.1968	-0.1293		4.834	0.0256		4.3905	-0.0593		4.3958	-0.0184	
4.3094	0.6683		4.9736	0.0985		4.5165	-0.0503		4.5309	-0.0378	
4.4219	3.84		5.1133	-0.0205		4.6326	-0.0143		4.6659	-0.0268	
4.5273	6.3936		5.2458	0.0673		4.7587	-0.0222		4.7974	-0.0519	
4.6471	8.1542		5.3818	0.0323		4.8847	0.0054		4.9361	-0.0015	
4.767	5.9666		5.5215	-0.0474		5.0008	0.0173		5.0711	0.0005	
4.8868	4.3501		5.6647	0.0701		5.1269	-0.0317		5.2097	-0.0514	
5.0139	2.6261		5.8008	0.113		5.2496	-0.0579		5.3448	0.03	
5.1483	1.5204		5.8831	0.0073		5.3757	-0.0561		5.4869	-0.0766	
5.2754	0.5572		5.9583	0.0164		5.505	-0.0981		5.622	-0.0426	
5.4098	0.4125		6.098	0.0571		5.6344	-0.0513		5.757	-0.0083	
5.5478	0.106		6.2233	-0.0274		5.7671	0.0006		5.9028	-0.0842	
5.6822	-0.0721		6.3486	0.0107		5.8998	0.0045		6.0378	-0.0589	
5.8166	0.1598		6.4704	-0.0617		6.0325	-0.0113		6.1516	-0.023	
5.9546	0.0062		6.585	-0.0055		6.0856	-0.0364		6.2688	-0.0666	
6.089	-0.0673		6.696	0.1335		6.1088	0.021		6.41[illegible]	0.0434	
6.1253	0.0282		6.7998	0.0005		6.2348	-0.0256		6.546	0.0141	
6.256	0.1031		6.9144	0.0242		6.2381	0.0218		6.6527	-0.0388	
6.3904	0.1198		7.0254	0.0881		6.2912	0.0174		6.8304	-0.0165	
6.5248	-0.008		7.1471	0.0335		6.4173	-0.0206		6.976	-0.0245	
6.6592	-0.1208		7.2832	0.0428		6.5533	-0.0071		7.1147	-0.0091	
6.7899	-0.0123		7.4157	0.1496		6.6827	-0.0293		7.2604	-0.0173	
6.9315	0.1234		7.5446	0.058		6.812	-0.0766		7.4026	-0.0255	
7.0695	0.1048		7.6771	0.1406		6.9414	-0.0248		7.5483	-0.1253	
7.2003	0.1911		7.8131	0.1706		7.0774	0.0889		7.6763	0.0218	
7.3383	0.192		7.9456	0.1564		7.2001	-0.049		7.8042	-0.0488	
7.4763	0.0148		8.0817	0.114		7.2333	-0.0031		7.9286	-0.0724	
7.6143	-0.0043		8.2213	-0.0527		7.3693	-0.0258		8.0566	-0.0224	
7.7523	-0.0604		8.3646	-0.0384		7.4954	-0.0028		8.1774	-0.0431	
7.8903	-0.0797		8.5006	0.0171		7.6115	-0.0528		8.2982	-0.0286	
8.0356	0.0474		8.6439	0.0323		7.7309	0.0121		8.4013	-0.0314	
8.1736	-0.0277		8.7871	1.0795		7.8437	-0.013		8.419	0.0343	
8.3116	0.0095		8.9267	23.3465		7.9565	-0.073		8.4973	-0.0024	
8.4605	-0.0605		8.9446	40.9347		8.056	0.0098		8.5186	0.0136	
8.5949	-0.0993		8.9984	54.8575		8.1124	-0.019		8.5435	0.0107	
8.7329	0.0422		9.0163	48.9707		8.2285	-0.0387		8.5826	-0.0603	
8.8746	0.1548		9.1631	70.8273		8.3346	-0.0326		8.5968	0.0089	
9.0126	0.0422		9.3099	84.2646		8.3678	-0.0038		8.6963	0.047	
9.1542	0.1062		9.4746	51.7993		8.4375	0.0204		8.714	0.0255	
9.2959	0.0505		9.6286	13.1408		8.4441	-0.0864		8.7709	0.0088	
9.3794	-0.0429		9.7861	9.4822		8.4474	0.0606		8.8313	0.079	
9.4339	-0.0923		9.9365	9.1991		8.5104	0.016		8.8349	0.2184	
9.5719	0.0022		10.0869	10.8405		8.5701	0.0334		8.874	0.2054	
9.7208	-0.0189		10.2337	10.1167		8.6	0.0363		8.938	0.1548	
9.8588	-0.1367		10.3805	9.7957					8.9842	0.0851	
10.0004	-0.1471		10.5273	9.6196					9.0837	0.0299	
10.1384	-0.0057		10.6777	11.0577					9.1583	0.0822	
10.291	-0.0919		10.8209	8.6419					9.2294	0.0173	
10.4326	0.0253		10.9677	2.3457					9.2543	0.026	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP005 Depth	CP005 Fluorescence	Potential Oil Thick (ft)	CP006 Depth	CP006 Fluorescence	Potential Oil Thick (ft)	CP007 Depth	CP007 Fluorescence	Potential Oil Thick (ft)	CP007A Depth	CP007A Fluorescence	Potential Oil Thick (ft)
10.5779	1.1115		11.1181	4.5798					9.2969	0.0432	
10.7195	1.4489		11.2614	10.8261					9.3005	0.0778	
10.8503	0.6006		11.4153	15.0785					9.3431	0.0585	
10.981	0.6244		11.555	17.4266					9.3538	0.0825	
11.1118	0.5381		11.7054	13.2413					9.3645	-0.0004	
11.2461	0.3313		11.8558	5.4705					9.3822	-0.0285	
11.3769	0.0382		12.0026	1.9327					9.3964	-0.0166	
11.504	0.0804		12.1494	0.2161					9.4	-0.0036	
11.642	0.0005		12.2675	0.165							
11.7728	0.0365		12.3965	0.1354							
11.8999	0.0755		12.5504	-0.0561							
12.0306	0.0971		12.6937	0.1917							
12.1614	3.3287		12.8369	1.1026							
12.2957	1.4232		12.9873	-0.1048							
12.4265	1.3399		13.1377	-0.0878							
12.5609	0.2239		13.2809	-0.0287							
12.579	0.0204		13.4313	-0.049							
12.6553	0.2152		13.5745	-0.0771							
12.7933	1.6187		13.7177	-0.0116							
12.9313	11.3505		13.8574	-0.011							
13.0766	12.2956		14.0042	-0.0348							
13.2255	11.3707		14.1438	-0.0432							
13.2618	11.2705		14.2799	-0.0479							
13.3199	9.8468		14.4196	-0.068							
13.4616	3.6325		14.552	-0.065							
13.6177	3.027		14.6809	-0.0262							
13.7703	1.7726		14.817	-0.1142							
13.9083	0.6246		14.9567	0.641							
14.0463	0.0997		15.0927	0.8269							
14.1843	0.1515		15.2288	0.9028							
14.3259	0.1348		15.3255	0.9229							
14.4639	0.2874		15.4222	0.8181							
14.602	0.4161		15.5618	0.7882							
14.7363	0.3994		15.7086	2.8148							
14.8743	0.2808		15.8518	3.7918							
15.016	0.2256		15.9879	8.3936							
15.1467	0.1458		16.1347	5.0774							
15.2775	0.2408		16.2815	5.0722							
15.4118	0.2697		16.4247	1.7634							
15.539	0.2091		16.5716	1.7042							
15.6697	0.0316		16.7148	0.4818							
15.8041	0.086		16.8544	0.3324							
15.8513	0.0065		17.0012	0.3263							
15.8549	0.0573		17.1516	0.3927							
15.982	0.093		17.2949	0.4182							
16.1092	-0.0073		17.4381	0.6873							
16.2399	0.0098		17.5849	0.6463							
16.3779	-0.0428		17.7281	0.2709							
16.5123	0.0378		17.8749	0.0456							
16.6503	0.0108		18.0217	0.2332							
16.7847	-0.0344		18.1686	0.194							
16.93	-0.0677		18.3154	0.0119							
17.0571	-0.0245		18.4622	0.1139							
17.1878	-0.0351		18.5123	-0.0563							
17.3186	-0.069		18.5911	-0.0872							
17.4566	-0.1114		18.6412	0.0697							
17.5946	-0.1658		18.788	2.0452							
17.7326	-0.0478		18.9348	24.3714							
17.8706	-0.0127		19.0852	44.5666							
18.0086	0.0039		19.2463	42.7846							
18.1466	0.0057		19.3967	36.5839							
18.2846	0.0388		19.5507	35.5416							
18.4226	0.2849		19.6725	30.1789							
18.5679	0.167		19.6868	17.8151							
18.7059	0.1534		19.8551	7.6923							
18.8221	-0.0084		20.0448	6.1486							
18.8403	-0.0609		20.2203	7.3906							
18.9783	-0.0563		20.3778	6.8753							
19.1163	-0.0359		20.539	6.7549							
19.1345	-0.0906		20.7073	6.8311							
19.1998	0.0296		20.872	6.5945							
19.3415	-0.0095		21.0331	6.8996							
19.4831	-0.0352		21.0653	2.7825							
19.6248	0.1956		21.205	3.8267							
19.7628	0.2368		21.3625	1.2121							
19.9044	0.1379		21.5201	1.189							
20.0497	0.1418		21.6776	0.4116							
20.1877	0.1663		21.8388	0.0562							
20.3366	0.1495		21.8567	0.1608							
20.4819	0.324		22.0214	20.7795							
20.6235	0.3464		22.1646	26.6452							
20.7688	0.3752		22.3222	41.2765							
20.9104	0.4031		22.4941	87.0786							
21.0593	0.3108		22.6051	71.8251							

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP005 Depth	CP005 Fluorescence	Potential Oil Thick (ft)	CP006 Depth	CP006 Fluorescence	Potential Oil Thick (ft)	CP007 Depth	CP007 Fluorescence	Potential Oil Thick (ft)	CP007A Depth	CP007A Fluorescence	Potential Oil Thick (ft)
21.1973	0.2196		22.6409	88.8495							
21.3462	0.5113		22.7984	120.2258							
21.4879	0.4939		22.9774	315.5574							
21.6295	0.4187		23.1565	233.9241	0.36						
21.7675	0.3924		23.3355	76.3136							
21.9092	0.327		23.5181	39.4221							
22.0545	0.3857		23.6936	37.7773							
22.1925	0.4216		23.8834	92.3526							
22.3377	0.4676		24.0624	63.0111							
22.4213	0.3796		24.2414	21.9523							
22.5484	1.1751		24.4133	23.5005							
22.6937	1.242		24.5888	9.937							
22.8317	1.1977		24.6425	33.8965							
22.9733	1.174		24.6496	26.9045							
23.1113	1.2227		24.8287	2.6882							
23.2566	1.1629		24.997	1.3346							
23.4019	1.197		25.1653	0.7441							
23.5399	1.113		25.3371	3.7716							
23.6779	1.0781		25.509	17.0788							
23.8159	1.1256		25.6737	30.0626							
23.9539	1.02		25.8456	0.7381							
24.0919	1.0124		25.9924	0.486							
24.2299	1.168		26.15	0.3115							
24.3643	1.1804		26.3003	0.2811							
24.4987	1.3943		26.4436	0.2986							
24.6367	2.8248		26.5653	0.3734							
24.7783	9.3777		26.6692	0.4419							
24.9127	4.0795		26.7945	0.4056							
25.0507	3.7052		26.9234	0.4056							
25.1887	3.5485		27.0523	0.3948							
25.3267	3.0972		27.1884	0.229							
25.4284	3.9722		27.328	0.2056							
25.6027	4.7463		27.4641	0.1067							
25.6935	2.9248		27.5966	0.0411							
25.7553	1.5765		27.7362	0.0334							
25.8897	1.4662		27.8544	0.0431							
26.0313	1.0572		27.8687	0.0531							
26.1729	0.7789		27.9224	0.0797							
26.3037	0.9943		28.0477	0.1131							
26.4272	0.9163		28.1981	0.3136							
26.5543	0.807		28.3521	0.4799							
26.6778	0.8362		28.5025	0.5005							
26.794	0.2946		28.66	0.5821							
26.892	0.3489		28.814	0.491							
26.9901	0.5448		28.925	0.5229							
27.0845	0.5546		28.9966	0.4371							
27.1354	0.5188		29.1685	0.5835							
27.1753	0.8035		29.3332	0.4923							
			29.5051	0.286							
			29.6805	0.1307							
			29.8345	0.1156							
			29.9921	0.1214							
			30.1675	0.2018							
			30.3358	0.1572							
			30.5113	0.2255							
			30.676	0.0916							
			30.8407	0.2115							
			30.9875	0.201							
			31.1057	0.1998							
			31.1164	0.2921							
			31.2274	0.202							
			31.3062	0.2134							
			31.3384	0.274							
			31.4029	0.292							
			31.4208	0.4778							
			31.4924	0.3841							
			31.6284	0.4631							
			31.632	0.5851							

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP005 Depth	CP005 Fluorescence	Potential Oil Thick (ft)	CP006 Depth	CP006 Fluorescence	Potential Oil Thick (ft)	CP007 Depth	CP007 Fluorescence	Potential Oil Thick (ft)	CP007A Depth	CP007A Fluorescence	Potential Oil Thick (ft)

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP007B Depth	CP007B Fluorescence	Potential Oil Thick (ft)	CP008 Depth	CP008 Fluorescence	Potential Oil Thick (ft)	CP009 Depth	CP009 Fluorescence	Potential Oil Thick (ft)	CP010 Depth	CP010 Fluorescence	Potential Oil Thick (ft)
0.0964	0.5832		0.0752	1.3444		0.111	2.0643		0.0129	-0.0062	
0.2127	0.515		0.2149	0.7123		0.2526	1.8288		0.1509	0.3031	
0.347	0.1986		0.3509	0.7256		0.3943	0.3811		0.2962	0.4807	
0.4778	0.1312		0.4799	0.1327		0.5323	0.1115		0.4342	0.4029	
0.6085	0.1508		0.6159	0.0194		0.6666	-0.0058		0.5831	0.197	
0.7429	0.093		0.7448	0.0024		0.8083	-0.0287		0.7175	0.1893	
0.8737	0.0977		0.8702	-0.0027		0.9463	-0.0989		0.8591	0.1874	
1.0044	0.1789		0.9955	-0.0387		1.0807	-0.0881		1.0008	0.277	
1.1351	0.0414		1.1315	0.0038		1.2187	0.0082		1.1424	0.1154	
1.2695	0.134		1.2569	-0.0484		1.364	-0.0149		1.2804	0.5544	
1.4148	0.0981		1.3894	0.0168		1.4983	-0.0453		1.4257	1.2582	
1.5455	-0.0101		1.5147	0.0504		1.6472	-0.0558		1.5746	5.9502	
1.6872	0.0539		1.64	-0.0182		1.7889	-0.0475		1.7162	15.8363	
1.8325	0.033		1.7617	-0.0015		1.9305	-0.028		1.8797	26.5623	
1.9777	0.001		1.8907	-0.064		2.0685	-0.0682		2.014	36.3135	
2.1157	0.029		2.0196	0.0581		2.2138	-0.0111		2.0903	39.4049	
2.2574	0.0153		2.1485	0.1048		2.3554	0.0155		2.2392	80.3453	
2.4027	-0.0134		2.2702	0.0191		2.4934	0.0141		2.4027	116.0903	
2.5407	0.0126		2.3991	-0.0574		2.6351	-0.021		2.5552	136.3888	
2.5842	0.0261		2.528	-0.0125		2.6714	-0.0019		2.7005	102.0591	
2.6315	0.0039		2.6104	-0.0302		2.7549	-0.0215		2.853	51.1229	
2.7767	-0.0162		2.7106	-0.0945		2.8966	0.0399		2.9983	24.3716	
2.9111	-0.0013		2.8395	-0.0339		3.0346	0.0049		3.0745	12.965	
3.0564	-0.0024		2.9613	-0.0716		3.1799	-0.0128		3.238	7.1404	
3.198	-0.0127		3.0902	-0.0499		3.3179	-0.0113		3.3832	6.746	
3.3469	0.0132		3.1869	-0.0287		3.4631	-0.0266		3.5249	6.1573	
3.4886	0.0019		3.2943	-0.0966		3.6048	0.0216		3.6702	25.8226	
3.6338	0.0305		3.4232	-0.0303		3.7501	0.0306		3.83	56.743	
3.7755	-0.0035		3.5628	-0.09		3.8881	0.0339		3.9898	84.2931	
3.9099	-0.0279		3.6953	-0.0511		4.0297	-0.0523		4.1387	96.6336	
4.0479	0.0271		3.8314	-0.0345		4.1786	0.0123		4.2876	102.0972	
4.1931	-0.0367		3.9675	-0.014		4.3203	-0.01		4.4365	76.9236	
4.3312	-0.0184		4.1035	-0.0449		4.4655	-0.0087		4.5817	73.8379	
4.4728	-0.0204		4.2396	-0.0703		4.6144	0.1414		4.7343	60.7854	
4.6144	-0.0473		4.3721	-0.0093		4.7524	-0.0463		4.8832	49.9649	
4.7524	-0.0254		4.433	-0.0087		4.8941	-0.0528		5.0321	50.2512	
4.8868	0.01		4.5153	0.0015		5.0357	-0.0268		5.1846	47.1955	
5.0321	0.021		4.6442	-0.0132		5.181	-0.0593		5.3263	47.0865	
5.1701	-0.0194		4.7839	-0.0357		5.3226	-0.0244		5.4679	54.0823	
5.3081	-0.0155		4.9199	-0.034		5.4643	-0.012		5.6132	35.889	
5.4461	-0.0061		5.0524	-0.0242		5.6059	0.0022		5.7585	42.7265	
5.5914	-0.0125		5.1921	-0.0052		5.7439	-0.0341		5.9074	85.1464	
5.733	-0.0475		5.3317	-0.0096		5.8819	-0.087		6.0563	79.5562	
5.871	-0.0012		5.4642	-0.0214		5.9836	-0.0082		6.2052	59.3994	
5.9401	-0.0664		5.6038	-0.0197		6.0454	-0.0841		6.3105	94.3617	
6.0853	-0.0244		5.7471	0.0271		6.187	-0.1126		6.3141	97.0175	
6.2306	-0.071		5.876	-0.0682		6.3287	-0.0557		6.3613	87.3822	
6.3722	-0.0553		5.9906	-0.0284		6.4739	-0.0564		6.5139	100.4444	
6.5175	-0.0056		6.1302	-0.0665		6.6119	-0.0551		6.6664	135.3625	
6.6592	-0.0363		6.2663	0.0679		6.7536	-0.0407		6.7972	161.3833	
6.7972	-0.0399		6.3952	-0.0029		6.8989	-0.0541		6.9824	188.3863	
6.9388	-0.0296		6.5313	0.0652		7.0405	-0.0654		7.1313	164.6198	
7.0841	-0.0008		6.6673	0.0762		7.1785	-0.0826		7.2766	142.8421	
7.2221	0.0124		6.7998	0.1059		7.3201	0.1051		7.4218	192.6645	
7.3601	-0.013		6.9323	0.1714		7.4618	0.3716		7.5744	185.2887	
7.4872	0.0034		7.0684	0.0971		7.5998	18.7185		7.7196	211.9065	0.15
7.6107	-0.0317		7.2008	0.0873		7.7196	57.8524		7.8322	180.2114	
7.7451	-0.0078		7.3333	0.0372		7.8504	60.1599		7.8395	84.6195	
7.8722	-0.0377		7.4658	0.0265		7.9957	75.2497		7.992	145.8958	
8.0029	-0.0039		7.5983	0.0368		8.1373	82.857		8.1446	164.921	
8.1373	-0.0479		7.7344	0.0773		8.2789	96.226		8.2935	172.9758	
8.2753	-0.0299		7.8633	0.1396		8.4206	115.1216		8.446	181.1417	
8.4133	0.0107		7.9958	0.049		8.5586	122.2145		8.5949	185.7082	
8.5477	-0.0008		8.1282	0.0379		8.7075	132.343		8.7438	134.59	
8.6784	-0.0117		8.2572	-0.0379		8.8491	125.6372		8.8964	138.8726	
8.8056	-0.0126		8.3932	-0.0424		8.9835	111.6777		9.0416	166.9413	
8.9363	0.113		8.5293	-0.0738		9.1252	109.1448		9.1869	184.4804	
9.0779	0.114		8.6618	-0.1066		9.2559	100.8609		9.3394	213.4218	
9.1687	0.0937		8.7978	-0.0306		9.3358	51.4436		9.492	211.7786	0.31
9.2741	0.0254		8.9339	-0.0402		9.492	68.9282		9.6118	190.3413	
9.4084	0.3448		9.0664	-0.0334		9.6336	100.2467		9.6772	147.7154	
9.5501	0.5347		9.1452	-0.0491		9.7716	103.2585		9.8261	132.1375	
9.6881	0.4462		9.2168	-0.0021		9.9096	127.7417		9.975	155.7809	
9.8334	0.1899		9.36	-0.0492		10.0513	128.8604		10.1239	175.4474	
9.9714	0.3702		9.5032	-0.0505		10.1965	123.7031		10.2728	211.2636	0.15
10.1166	1.3452		9.6393	0.0017		10.3382	154.4687		10.3927	184.4278	
10.2583	0.7869		9.779	1.9287		10.5125	116.364		10.5743	146.9551	
10.3999	0.4877		9.9222	0.5703		10.676	128.0938		10.7304	105.5099	
10.5379	0.1026		10.0618	0.3009		10.8176	255.2232		10.8757	151.8195	
10.6832	0.4644		10.1979	0.1995		10.9629	238.6625		11.0282	158.9837	
10.8212	2.3396		10.3447	0.2451		11.1045	275.3369		11.1771	154.3562	
10.9701	10.4937		10.4808	0.1702		11.2498	292.5148	0.43	11.326	130.0287	
10.9774	11.4213		10.6204	-0.0471		11.4059	149.3339		11.3951	89.5708	
11.119	13.0291		10.7601	0.0002		11.5621	33.9106		11.544	70.3574	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP007B Depth	CP007B Fluorescence	Potential Oil Thick (ft)	CP008 Depth	CP008 Fluorescence	Potential Oil Thick (ft)	CP009 Depth	CP009 Fluorescence	Potential Oil Thick (ft)	CP010 Depth	CP010 Fluorescence	Potential Oil Thick (ft)
11.228	13.865		10.9033	0.0243		11.7255	40.5418		11.6965	63.1853	
11.4023	10.7797		11.0394	-0.0508		11.8817	54.6819		11.8454	55.9241	
11.544	4.9897		11.1862	0.0209		12.0234	74.8169		12.0052	54.453	
11.6929	2.2015		11.3258	-0.0078		12.1686	66.0561		12.1577	64.3475	
11.8418	3.9721		11.4655	0.0374		12.3103	114.1965		12.3103	61.6808	
11.9834	6.8409		11.6087	0.0206		12.4592	243.8694	0.15	12.4555	106.3872	
12.1287	6.6828		11.7519	0.1493		12.5137	74.5929		12.6081	93.9305	
12.2667	5.8052		11.9345	0.0596		12.5609	62.9254		12.7606	90.3326	
12.412	5.8791		12.0742	0.332		12.7061	22.3302		12.9023	69.3864	
12.4374	4.1155		12.2103	0.3379		12.8659	15.1461		12.9168	74.193	
12.55	3.7122		12.3463	-0.0172		13.0112	22.8618		13.0584	102.1749	
12.6807	2.594		12.3714	0.0094		13.1529	31.0048		13.2001	82.6719	
12.826	1.7263		12.3893	-0.0058		13.3018	8.729		13.3453	114.8173	
12.9676	1.2112		12.5289	0.1007		13.4761	4.7021		13.4979	10.2801	
13.1056	0.364		12.6686	0.0304		13.6395	24.0564		13.6577	21.9234	
13.2509	0.2772		12.8082	-0.0289		13.803	91.64		13.8066	52.9702	
13.3998	0.1843		12.9479	0.062		13.9591	98.8925		13.9519	47.9949	
13.5451	1.3703		13.0911	0.0251		14.0971	57.8723		14.1008	39.1574	
13.6831	0.1607		13.2272	0.0534		14.2388	72.1855		14.2388	28.6099	
13.8247	0.0293		13.3668	0.0089		14.384	18.8928		14.3768	26.3186	
13.97	0.3681		13.5136	0.0152		14.5402	7.191		14.5184	52.6385	
14.1044	1.0412		13.6497	-0.055		14.6601	3.4854		14.6564	107.9205	
14.2424	0.199		13.7929	0.0299		14.7145	4.2303		14.8053	195.2422	
14.3913	0.1836		13.9362	0.1006		14.8671	3.142		14.9397	111.6948	
14.5329	0.3735		14.0722	0.0599		15.0051	2.0753		15.0814	205.735	
14.671	0.2093		14.2119	0.2557		15.154	2.4332		15.2157	214.394	
14.8126	0.1031		14.3515	0.3003		15.2956	3.4001		15.3574	298.2013	
14.9506	0.0539		14.4912	0.4843		15.4409	9.161		15.5099	324.0754	
15.0922	0.0286		14.6272	0.339		15.5862	51.9585		15.6007	324.3966	0.66
15.2375	0.0212		14.7669	0.2669		15.7387	102.0013		15.6261	144.9187	
15.3755	-0.0088		14.8886	0.1833		15.8222	58.6853		15.746	76.7694	
15.5135	0.6766		14.9817	0.2161		15.8477	37.9904		15.8912	46.1266	
15.6552	1.2666		15.1178	0.2271		15.9857	79.8811		16.0474	37.1468	
15.7169	1.0988		15.2574	0.134		16.1309	85.3726		16.2	46.3209	
15.7932	1.0868		15.3971	0.107		16.2726	56.9656		16.229	27.5101	
15.8876	0.7563		15.5332	0.0358		16.4106	83.113		16.3815	34.3434	
16.0184	0.7178		15.569	0.0068		16.5522	30.4696		16.5341	18.6	
16.1636	0.4503		15.6119	-0.0349		16.6975	159.8846		16.6866	13.7647	
16.3053	0.4757		15.7587	0.03		16.8355	169.1388		16.8428	24.9652	
16.4433	0.2856		15.8984	-0.0155		16.9735	27.5331		16.999	15.6103	
16.5849	0.2266		16.038	-0.0853		17.1224	13.1096		17.1515	22.0437	
16.7338	2.2954		16.1813	-0.0196		17.2786	40.2042		17.3077	35.4729	
16.8791	8.6059		16.3209	-0.0925		17.4166	22.7533		17.4638	36.2578	
17.0244	0.5917		16.457	-0.0827		17.5619	24.1954		17.6273	41.052	
17.0353	0.4685		16.5966	-0.0492		17.6999	18.4699		17.7725	67.1648	
17.0716	0.5544		16.7399	-0.0084		17.8343	22.4401		17.9214	29.6833	
17.2132	0.4283		16.8831	-0.0082		17.9723	16.2366		18.074	26.8493	
17.3549	0.4478		17.0263	0.0874		18.1176	21.9656		18.1212	22.3795	
17.4965	0.5171		17.1695	0.1383		18.2592	14.1885		18.2846	26.4478	
17.6382	0.4995		17.3092	-0.0332		18.3936	16.5467		18.4335	17.3207	
17.7798	0.4139		17.4488	-0.0343		18.5388	19.1773		18.5897	13.6931	
17.9251	0.4712		17.5921	-0.1436		18.6841	9.1939		18.7495	14.4176	
18.074	0.4571		17.7353	-0.0822		18.8476	3.9345		18.8984	12.8338	
18.2192	0.4726		17.8749	-0.021		19.0037	24.0364		19.0509	13.5492	
18.3609	0.4343		18.0146	0.057		19.0764	23.5573		19.0618	22.4013	
18.5134	0.4942		18.1542	0.0423		19.1853	22.1747		19.2325	12.214	
18.6587	0.4452		18.2939	-0.0281		19.3487	7.5449		19.4032	12.6313	
18.7931	0.4963		18.4335	0.0361		19.5049	10.7089		19.5231	10.8021	
18.9384	0.4853		18.5696	0.1211		19.6575	14.7655		19.6901	15.5868	
18.9965	0.5537		18.7092	0.1173		19.7991	11.2313		19.8499	9.3047	
19.109	0.6193		18.8346	0.0878		19.948	8.6964		20.017	8.2366	
19.2543	0.69		18.9778	0.237		20.086	7.3705		20.195	2.0002	
19.396	0.7653		19.1174	0.1229		20.2313	3.392		20.3802	1.0186	
19.5376	0.961		19.2535	0.1348		20.3911	3.4176		20.5472	1.2255	
19.6683	1.1302		19.3967	0.1923		20.5291	6.977		20.7034	2.0621	
19.7991	9.0306		19.5364	0.1148		20.6707	3.8038		20.8196	1.9829	
19.9335	12.2067		19.6725	0.2363		20.816	1.1514		20.9722	0.5064	
19.9589	11.967		19.8157	0.3572		20.954	0.8597		21.1392	0.2483	
20.0497	15.9133		19.9553	0.4116		21.0957	0.8961		21.299	0.3628	
20.2204	111.4814		20.0914	0.2374		21.2373	0.6904		21.4552	0.3675	
20.3838	295.8037		20.2275	0.2056		21.3789	0.4061		21.6077	0.5574	
20.5291	275.184		20.2776	0.1791		21.5242	0.3777		21.7639	0.5344	
20.6816	246.1806		20.4172	0.2173		21.6695	0.3165		21.9128	0.2695	
20.8487	346.1793		20.5497	0.163		21.8111	0.3156		22.0617	0.3181	
21.0085	286.9918		20.6858	0.2656		21.9491	0.3061		22.2143	0.2973	
21.1647	307.1988		20.8326	0.8782		22.0908	0.3982		22.3813	0.2327	
21.3245	349.4887		20.8863	0.245		22.236	0.2608		22.5339	0.2431	
21.477	383.8433		20.9185	0.2564		22.3704	0.166		22.69	0.3504	
21.6441	376.027		21.0546	0.2648		22.385	0.2273		22.7445	0.6934	
21.8002	395.2313	1.58	21.1119	0.38		22.4431	0.2055		22.8825	6.4858	
21.9528	122.9999		21.248	0.2706		22.5811	0.2413		23.0459	36.3096	
22.1198	90.932		21.384	1.3798		22.7118	0.2649		23.2275	89.1578	
22.2833	36.4165		21.4556	44.5043		22.8462	0.3171		23.3401	109.3695	
22.2905	47.1544		21.5989	108.4922		22.9842	0.3018		23.4091	92.1181	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP007B Depth	CP007B Fluorescence	Potential Oil Thick (ft)	CP008 Depth	CP008 Fluorescence	Potential Oil Thick (ft)	CP009 Depth	CP009 Fluorescence	Potential Oil Thick (ft)	CP010 Depth	CP010 Fluorescence	Potential Oil Thick (ft)
22.454	13.1587		21.7385	30.6046		23.1222	0.3793		23.5653	56.3718	
22.621	16.6408		21.8889	47.7582		23.2639	0.3528		23.7178	67.7136	
22.7881	27.5328		22.025	42.4684		23.3982	0.8048		23.8304	40.9317	
22.9406	26.9441		22.0858	106.6111		23.5362	5.564		23.9866	24.6946	
23.1004	37.1094		22.1933	111.2134		23.6779	17.4162		24.1645	37.3325	
23.2566	30.7573		22.3329	37.3423		23.8195	10.5199		24.3425	17.9933	
23.4019	42.8045		22.4726	18.5846		23.9503	9.0006		24.5241	6.2727	
23.5508	39.3724		22.623	31.1866		24.081	13.7936		24.6984	9.187	
23.7251	29.5342		22.759	39.2438		24.219	20.2859		24.8473	7.7365	
23.8849	29.3803		22.8951	45.1097		24.357	19.5361		25.018	7.2876	
24.0556	37.2672		23.0383	46.2125		24.4878	63.0371		25.1778	4.5825	
24.2081	22.9828		23.1708	46.0981		24.6149	36.4637		25.3449	4.9047	
24.3716	21.4235		23.314	83.2277		24.6585	43.6886		25.5156	4.29	
24.5459	10.8935		23.4644	76.7375		24.9272	33.379		25.6863	4.0122	
24.7129	8.1966		23.6112	69.8454		25.0362	23.1904		25.8388	3.4695	
24.8582	9.9744		23.7509	53.4251		25.1851	8.5632		25.9514	3.036	
25.0253	30.6956		23.9156	23.4782		25.3485	5.8075		26.064	6.1843	
25.1815	21.5271		24.0839	24.4681		25.4902	2.6332		26.2165	2.1939	
25.3413	2.6552		24.22	20.9919		25.6572	1.0651		26.3872	0.6789	
25.4829	2.0662		24.3632	13.3659		25.7989	0.7136		26.5652	-0.01	
25.5337	1.4484		24.5064	20.7766		25.886	1.5667		26.7359	-0.0455	
25.7044	10.1469		24.6461	13.2048		26.0349	0.9357		26.8993	-0.0247	
25.8715	4.3884		24.7857	4.7318		26.1875	0.6727		27.0555	-0.0358	
26.0204	0.7678		24.9433	1.9076		26.3436	0.541		27.2116	-0.0016	
26.162	0.6333		25.0757	0.8899		26.5034	0.5443		27.3751	-0.0269	
26.311	0.3972		25.1438	6.6642		26.6596	0.6041		27.5312	-0.0355	
26.4344	0.2876		25.2476	2.8215		26.8158	0.5819		27.691	0.0281	
26.5034	0.3466		25.2977	17.3993		26.9792	0.304		27.8436	0.018	
26.5434	0.1621		25.3801	33.1011		27.1354	0.3299		28.0034	0.0418	
26.6487	0.3473		25.5054	2.4512		27.2879	0.1532		28.1559	0.0362	
26.6778	0.388		25.6308	4.5945		27.4332	-0.0406		28.3157	0.1134	
26.725	0.3241		25.7346	0.6054		27.5676	0.0057		28.4719	0.088	
26.8158	0.5483		25.8098	21.7403		27.7128	0.0589		28.6244	0.0753	
26.8884	0.4064		25.9315	27.4274		27.8726	0.2878		28.7988	0.099	
26.9138	0.2777		25.9423	119.3272		28.0215	0.1835		28.9731	0.1613	
26.9465	0.6586		26.0282	78.3214		28.1704	0.1484		29.1401	0.1426	
27.0627	0.297		26.0927	33.5892		28.3302	0.075		29.22	0.309	
27.1463	0.2555		26.2323	25.2673		28.4864	0.0922		29.2818	0.295	
			26.3469	24.1388		28.6317	0.0349		29.4307	0.4467	
			26.4006	21.9466		28.7842	0.0149		29.605	0.4177	
			26.5295	8.3664		28.9222	0.08		29.7648	0.2162	
			26.6727	9.5766		28.9767	0.0946		29.9355	0.1018	
			26.8267	43.2915		28.9803	0.062		30.0917	-0.0435	
			26.9807	51.4359		29.1547	0.0522		30.2624	-0.0339	
			27.038	35.3708		29.1619	0.0097		30.4149	0.0653	
			27.1884	35.3548		29.1692	0.0699		30.5929	0.0156	
			27.3387	27.1733		29.2818	0.0502		30.7454	0.0307	
			27.4927	14.9898		29.4234	0.0609		30.8979	0.0956	
			27.6574	10.785		29.5651	0.0685		31.0614	-0.0088	
			27.84	6.9667		29.7031	0.1432		31.2139	-0.0318	
			27.9904	7.2323		29.8375	0.249		31.3628	-0.0665	
			28.1408	7.1754		29.9391	0.2502		31.5154	-0.0958	
			28.2912	6.4931		29.9428	0.1043		31.657	-0.0058	
			28.4488	3.0757		30.0626	0.0976		31.8095	-0.0552	
			28.4989	1.4559		30.1171	0.009		31.9366	-0.0318	
			28.6278	0.9914					32.0238	0.0175	
			28.7639	1.2444							
			28.9071	1.3133							
			29.0467	0.8909							
			29.1757	0.83							
			29.3153	0.6224							
			29.3833	0.6314							
			29.4836	0.5503							
			29.6089	0.4207							
			29.745	0.4371							
			29.8882	0.5962							
			30.0314	0.6401							
			30.1639	0.4997							
			30.3036	0.4098							
			30.4432	0.226							
			30.5793	0.1926							
			30.7082	0.1804							
			30.8443	0.2117							
			30.9732	0.1964							
			31.1092	0.3107							
			31.1415	0.5921							
			31.2238	0.2554							
			31.2381	0.2088							
			31.3062	0.3385							
			31.4494	0.1185							
			31.5855	0.2541							
			31.718	1.2344							
			31.7502	1.4382							
			31.7573	1.5581							

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP007B Depth	CP007B Fluorescence	Potential Oil Thick (ft)	CP008 Depth	CP008 Fluorescence	Potential Oil Thick (ft)	CP009 Depth	CP009 Fluorescence	Potential Oil Thick (ft)	CP010 Depth	CP010 Fluorescence	Potential Oil Thick (ft)
			31.8862	2.8448							
			32.0008	2.5014							
			32.0187	0.3255							
			32.0903	0.3459							
			32.2049	0.2287							
			32.2372	0.1273							

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP011 Depth	CP011 Fluorescence	Potential Oil Thick (ft)	CP012 Depth	CP012 Fluorescence	Potential Oil Thick (ft)	CP012A Depth	CP012A Fluorescence	Potential Oil Thick (ft)	CP013A Depth	CP013A Fluorescence	Potential Oil Thick (ft)
0.0165	4.383		0.0747	0.6609		0.0274	-0.0624		0.0057	-0.1693	
0.1546	4.7255		0.2018	0.8624		0.18	0.0417		0.1182	0.8785	
0.2998	4.9664		0.3144	1.4411		0.3325	-0.0595		0.2345	1.1684	
0.4451	2.9728		0.4197	0.68		0.5613	0.118		0.3398	0.8811	
0.5867	0.2429		0.5286	0.2535		1.4293	0.0655		0.3688	0.2902	
0.7284	0.1501		0.6303	0.12		2.2683	0.1153		0.4306	0.2115	
0.87	-0.0165		0.7248	0.0794		2.893	0.8231		0.456	-0.0015	
1.0189	0.0231		0.8264	0.0151		2.8966	1.2679		0.4996	-0.0248	
1.1569	0.0452		0.9136	-0.0697		3.4268	1.1548		0.5105	-0.151	
1.3058	0.0044		0.9608	-0.0349		4.3021	0.7731				
1.4547	0.0342		1.0117	0.0009		5.1701	0.1186				
1.5964	-0.0222		1.1206	-0.0319		6.0127	0.1002				
1.7489	-0.0245		1.2405	-0.0245		6.1035	0.0016				
1.8942	-0.0431		1.3531	0.0199		6.1071	0.1999				
2.0431	-0.0009		1.4729	-0.0397		6.1362	0.1469				
2.192	0.0291		1.5819	-0.0562		7.0478	0.05				
2.3373	0.0053		1.6944	-0.0323		8.0356	0.1318				
2.4826	0.0306		1.8179	-0.0707		9.0162	0.2202				
2.6024	0.0656		1.9378	-0.0416		9.4992	0.3964				
2.6787	0.0568		2.0649	-0.0644		9.59	0.4127				
2.8348	0.0642		2.192	0.0017		10.5125	0.3311				
2.9765	0.1182		2.3228	-0.0565		11.4604	0.2268				
3.129	0.0424		2.4571	0.0145		12.4483	0.0991				
3.2707	-0.002		2.5951	0.041		12.7497	-0.0151				
3.4196	0.0107		2.6932	0.0647		12.7824	0.05				
3.5612	-0.005		2.7985	0.3128		13.6722	0.1851				
3.7101	-0.0564		2.9365	0.5341		14.6637	1.2019				
3.8445	-0.0111		3.0782	0.3347		15.6806	0.1017				
3.9861	-0.009		3.1944	0.2746		16.1491	-0.0706				
4.1241	-0.0269		3.2089	0.179		16.3162	-0.0451				
4.2694	-0.0822		3.3578	0.1727		17.2931	-0.2014				
4.3239	-0.0453		3.4958	0.1653		18.3137	-0.1855				
4.3493	-0.0226		3.6447	0.6011		18.4735	-0.1997				
4.4982	-0.0205		3.7936	0.2952		18.5425	-0.2059				
4.6435	-0.0807		3.9353	0.1943		18.6878	-0.2075				
4.7851	-0.0534		4.0806	0.0898		18.8258	-0.2537				
4.934	-0.0519		4.2222	0.1274		18.971	-0.2137				
5.0866	0.0255		4.3675	0.0239		19.1199	-0.2642				
5.2318	0.1042		4.5091	-0.0521		19.1708	-0.0682				
5.3771	0.0765		4.658	-0.0415		19.3088	0.7741				
5.5297	0.1111		4.8069	0.0161		19.4504	1.1031				
5.6749	-0.0137		4.9486	0.0768		19.603	1.3612				
5.8238	-0.0008		5.0902	0.0501		19.7482	2.4943				
5.8819	0.003		5.2318	0.1416		19.8935	3.0448				
6.0127	-0.02		5.3735	0.09		19.9843	6.022				
6.1616	-0.0702		5.5151	0.0182		20.0315	5.3329				
6.3032	-0.0703		5.664	0.0878		20.1732	5.8023				
6.4521	-0.0954		5.8129	-0.0392		20.3184	16.2829				
6.5974	-0.0436		5.9546	0.055		20.471	14.1927				
6.7427	-0.0907		5.9982	0.0354		20.609	10.9721				
6.8916	-0.0851		6.0272	0.048		20.747	10.1791				
7.0369	-0.0067		6.1725	0.0286		20.8923	6.1211				
7.1821	-0.0277		6.3214	0.1605		21.0339	17.6192				
7.3274	-0.041		6.4703	0.4846		21.1465	33.9627				
7.4727	-0.0334		6.6192	0.7346		21.1973	19.136				
7.618	-0.0276		6.7645	0.6657		21.3245	37.1229				
7.7632	-0.0287		6.9097	0.8611		21.408	5.4054				
7.9121	0.1326		7.0587	0.8624		21.5315	9.2099				
8.0538	0.1294		7.2076	0.5703		21.6767	5.7494				
8.1954	-0.0158		7.3565	0.5838		21.8293	9.8919				
8.3479	1.1579		7.5054	0.2555		21.9782	7.6515				
8.4896	1.5279		7.6579	0.8606		22.1162	10.9302				
8.6312	0.4262		7.7995	0.11		22.2687	21.5969				
8.7765	0.0876		7.9521	0.0236		22.4394	4.9583				
8.9181	0.0492		8.101	0.0829		22.4903	6.4289				
9.0634	0.0393		8.2463	0.0446		22.552	6.2317				
9.1578	-0.0025		8.3988	0.0391		22.7082	1.1818				
9.2377	0.0395		8.5441	0.0097		22.8716	0.3997				
9.383	-0.061		8.693	-0.0541		23.0169	0.1581				
9.5247	-0.0806		8.8382	-0.0356		23.1585	0.3952				
9.6663	-0.0626		8.9835	-0.0514		23.3002	0.2824				
9.8079	-0.0551		9.1324	-0.002		23.4382	0.1432				
9.9205	-0.0156		9.2777	-0.1081		23.5762	0.3252				
10.1058	0.0232		9.2995	-0.003		23.7251	0.2203				
10.2547	-0.0277		9.383	-0.0699		23.874	0.1691				
10.3999	-0.0011		9.5319	-0.0488		24.012	0.2266				
10.5525	-0.0373		9.6772	-0.0784		24.1573	0.1399				
10.7014	0.0401		9.8261	-0.0919		24.2989	0.05				
10.8466	0.2484		9.9714	-0.0226		24.4406	0.018				
10.9956	0.6487		10.1203	-0.0715		24.5858	-0.0247				
11.1481	0.7169		10.2692	-0.0334		24.7347	0.0057				
11.2934	1.015		10.4108	-0.0255		24.8727	-0.0341				
11.4459	0.5522		10.5597	-0.009		25.0071	0.0211				
11.5912	0.3741		10.705	-0.015		25.1488	0.0409				

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP011 Depth	CP011 Fluorescence	Potential Oil Thick (ft)	CP012 Depth	CP012 Fluorescence	Potential Oil Thick (ft)	CP012A Depth	CP012A Fluorescence	Potential Oil Thick (ft)	CP013A Depth	CP013A Fluorescence	Potential Oil Thick (ft)
11.7401	0.3803		10.8575	-0.0337		25.2904	-0.1969				
11.8853	0.4306		10.9992	-0.0001		25.4284	-0.1541				
12.0343	0.4377		11.1517	-0.0293		25.5592	-0.1091				
12.1832	0.735		11.297	-0.075		25.6863	-0.1245				
12.3284	1.3549		11.4386	-0.0761		25.7989	-0.1191				
12.4301	1.1053		11.5839	-0.0375		25.8098	-0.103				
12.4846	1.0164		11.7364	-0.03		25.8824	-0.0398				
12.5899	0.9507		11.8781	-0.0501		25.955	0.0589				
12.6626	1.0066		12.0306	0.051		26.0131	0.1692				
12.8151	2.2153		12.1759	0.0494		26.0785	0.2482				
12.9749	3.4668		12.3248	-0.0208		26.0967	0.1218				
13.1238	3.5257		12.4664	0.0944		26.1403	0.0241				
13.2727	3.212		12.6153	-0.0315		26.2383	0.0883				
13.4252	2.1457		12.688	-0.0174		26.3255	0.1133				
13.5741	2.2348		12.8333	0.016		26.4054	0.0523				
13.7231	2.5828		12.9785	-0.0306		26.4163	0.1001				
13.8792	3.0472		13.1238	-0.0183		26.4599	0.2585				
14.0281	3.222		13.2618	0.0042		26.5398	0.2626				
14.1807	3.0697		13.4034	0.0004		26.5579	0.3464				
14.3332	3.1153		13.5451	-0.0353		26.6306	0.1689				
14.4857	3.7417		13.6831	0.0256		26.6669	0.1494				
14.6419	1.2311		13.8284	0.1084		26.7286	0.1571				
14.7944	0.4092		13.97	0.0099		26.7395	0.0105				
14.9397	0.3256		14.1189	0.0986		26.7504	-0.0188				
15.085	5.0832		14.2569	0.1272		26.7577	0.0117				
15.2375	4.2211		14.3986	2.6705		26.7649	-0.0483				
15.3864	8.7197		14.5402	2.1479		26.7686	-0.0847				
15.4772	5.9251		14.6346	1.2407		26.7831	-0.0148				
15.4881	5.9265		14.7726	1.4003		26.7976	-0.0708				
15.5753	4.7788		14.9179	0.4672		26.8339	-0.0688				
15.7024	2.4736		15.0632	0.2988		26.8412	-0.0845				
15.7496	15.9416		15.2048	0.029		26.9066	-0.0812				
15.913	37.5369		15.3537	-0.0787		26.9538	-0.0685				
16.091	46.7803		15.5026	-0.0017		26.9756	-0.0573				
16.2726	45.6971		15.6443	0.0591							
16.4469	64.6048		15.7932	0.0015							
16.5995	63.637		15.9239	-0.0086							
16.7629	37.1063		16.0728	-0.0302							
16.9154	44.2019		16.2217	0.0499							
17.0789	19.3451		16.3743	0.0452							
17.2532	14.8003		16.5196	0.0429							
17.413	17.7683		16.6685	-0.0074							
17.5655	24.7401		16.8174	-0.0547							
17.729	6.815		16.9663	-0.023							
17.9105	26.2474		17.1188	-0.0107							
18.0667	5.0885		17.2713	0.0383							
18.2447	8.2891		17.4166	-0.0204							
18.4081	10.6393		17.5728	0.0025							
18.557	11.0806		17.7253	0.0068							
18.7023	4.7119		17.8742	0.036							
18.7785	1.94		18.0195	0.0253							
18.942	1.1682		18.172	-0.0129							
19.0982	0.6376		18.3246	-0.0078							
19.2507	0.4364		18.4662	0.0502							
19.4105	0.4373		18.6187	-0.0483							
19.5594	0.3142		18.7713	0.0456							
19.7192	0.285		18.9093	-0.0597							
19.8754	0.3636		19.0509	0.0299							
20.0243	0.4425		19.1962	-0.0333							
20.1732	0.5262		19.2362	0.0707							
20.3184	0.2093										
20.4673	0.3627										
20.6163	11.6958										
20.7724	14.6798										
20.9431	32.2451										
21.0993	32.9994										
21.1828	22.7678										
21.2264	46.8209										
21.368	54.8111										
21.5169	43.0656										
21.684	9.7242										
21.8256	44.609										
21.9746	14.6043										
22.0399	16.6751										
22.1888	20.2234										
22.3341	14.0896										
22.345	17.2065										
22.3813	14.575										
22.5339	28.1786										
22.6828	6.9723										
22.8389	5.4354										
22.9987	5.8242										
23.1622	4.0626										
23.322	3.4234										

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP011 Depth	CP011 Fluorescence	Potential Oil Thick (ft)	CP012 Depth	CP012 Fluorescence	Potential Oil Thick (ft)	CP012A Depth	CP012A Fluorescence	Potential Oil Thick (ft)	CP013A Depth	CP013A Fluorescence	Potential Oil Thick (ft)
23.4672	0.9116										
23.6125	1.1916										
23.7723	1.0925										
23.9321	0.5711										
24.0846	0.6838										
24.2444	0.5952										
24.4006	0.4804										
24.5386	0.4025										
24.7021	1.3972										
24.8619	1.2521										
24.9999	1.2087										
25.1[illegible]33	0.6114										
25.2614	0.3704										
25.3086	0.4317										
25.4502	0.4127										
25.6064	0.2081										
25.7553	0.284										
25.9115	1.5584										
26.064	0.7434										
26.2202	0.1895										
26.3727	0.1026										
26.5252	0.0252										
26.6632	0.0238										
26.8194	0.0692										
26.9683	0.0293										
27.1208	0.0554										
27.2625	0.2682										
27.3932	0.5071										
27.5494	1.5812										
27.6947	0.8262										
27.8291	0.6577										
27.978	0.3432										
28.1305	0.1828										
28.2758	0.1565										
28.4283	0.1363										
28.5373	0.0449										
28.6535	0.002										
28.7733	0.0823										
28.8859	0.0736										
28.9694	0.1793										
29.0421	0.1763										
29.0784	0.2323										
29.1147	0.2569										
29.2382	0.314										
29.3617	0.2781										
29.4815	0.2354										
29.5978	0.2145										
29.6668	1.1105										
29.6849	1.991										
29.8048	1.039										
29.9319	0.4142										
30.0554	0.302										
30.1716	0.1065										
30.2878	0.0937										
30.2951	0.3657										
30.3169	0.3481										

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP011	CP011	Potential	CP012	CP012	Potential	CP012A	CP012A	Potential	CP013A	CP013A	Potential
Depth	Fluorescence	Oil Thick (ft)	Depth	Fluorescence	Oil Thick (ft)	Depth	Fluorescence	Oil Thick (ft)	Depth	Fluorescence	Oil Thick (ft)

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP013B Depth	CP013B Fluorescence	Potential Oil Thick (ft)	CP013C Depth	CP013C Fluorescence	Potential Oil Thick (ft)	CP014 Depth	CP014 Fluorescence	Potential Oil Thick (ft)	CP015 Depth	CP015 Fluorescence	Potential Oil Thick (ft)
0.0093	0.1077		0.1182	1.378		0.0819	0.4604		0.0311	0.8441	
0.1255	0.2005		0.2635	1.6777		0.2308	0.6351		0.1763	1.8073	
0.2417	0.6847		0.4124	0.6076		0.3725	0.503		0.3289	1.1571	
0.3434	0.5809		0.5504	0.0304		0.5177	0.3432		0.4669	0.5392	
0.4342	0.4406		0.6921	-0.0537		0.6594	0.0705		0.6049	0.2156	
0.4959	0.0755		0.8301	-0.0557		0.8047	0.1079		0.7574	0.0614	
0.5577	0.1265		0.9681	0.0207		0.9499	0.063		0.9027	0.0361	
0.594	0.0268		1.1061	0.0156		1.0988	0.1869		1.0444	0.015	
0.6194	-0.0272		1.255	0.0513		1.2368	0.0591		1.1896	-0.0197	
0.6303	-0.0088		1.393	0.0451		1.3857	0.0436		1.3385	-0.0218	
0.7066	-0.1351		1.531	-0.0232		1.531	0.0863		1.4802	-0.0366	
0.7865	-0.1743		1.669	-0.0923		1.6799	0.0256		1.6218	-0.0525	
0.8301	-0.1982		1.8107	-0.1436		1.8216	-0.0529		1.7635	-0.0385	
0.8373	-0.2586		1.9523	-0.0165		1.9741	-0.046		1.9051	-0.0761	
			2.0976	0.0526		2.1157	-0.0161		2.0504	-0.0415	
			2.2465	0.0246		2.2646	-0.0223		2.1956	-0.0032	
			2.3845	0.0667		2.4135	-0.0109		2.3409	0.0717	
			2.5334	0.6387		2.508	-0.0094		2.4862	0.0495	
			2.675	3.3986		2.6097	0.0499		2.6278	0.0027	
			2.6787	4.4098		2.7549	-0.0425		2.6823	0.0119	
			2.7005	4.3885		2.9002	-0.0682		2.6968	0.0021	
			2.8457	8.5994		3.0528	0.0016		2.7041	-0.0162	
			2.9946	14.4242		3.2017	0.0002		2.7077	0.0245	
			3.1435	13.1376		3.3469	-0.0207		2.7114	-0.0153	
			3.2888	28.7651		3.4886	-0.0219		2.784	0.0129	
			3.3179	34.0097		3.6302	-0.0089		2.9256	0.0465	
			3.4668	33.6659		3.7755	0.0078		3.0745	0.0149	
			3.6157	55.8696		3.9208	-0.0551		3.2271	0.0217	
			3.761	62.6014		4.0624	0.0258		3.376	0.0457	
			3.9099	54.4816		4.2077	0.0112		3.5249	0.0007	
			4.0588	65.5181		4.3602	0.0963		3.6702	-0.0288	
			4.2113	69.0413		4.5018	0.1328		3.8154	0.0096	
			4.3602	56.3591		4.6471	0.0163		3.9643	0.0192	
			4.491	45.7232		4.7924	0.0968		4.1132	-0.0272	
			4.6399	34.7591		4.9377	0.0056		4.2621	0.0041	
			4.7888	41.6839		5.0793	0.0244		4.4074	0.0012	
			4.9486	67.6353		5.2246	-0.0002		4.5527	0.0257	
			5.0938	80.2296		5.3662	-0.012		4.7016	0.0253	
			5.2573	120.444		5.5151	0.0021		4.8505	0.0262	
			5.4062	158.9863		5.6604	-0.0121		4.9958	0.0411	
			5.5551	159.5915		5.8057	0.0211		5.141	0.0154	
			5.704	148.5823		5.8166	-0.0389		5.29	-0.036	
			5.8565	131.4967		5.8275	-0.008		5.4352	0.0547	
			5.9945	103.8734		5.9764	-0.046		5.5841	0.0086	
			6.1144	115.3793		6.1216	-0.0633		5.7258	0.0702	
			6.2597	118.6975		6.2633	-0.0286		5.8747	-0.0309	
			6.4122	110.6115		6.4086	0.2606		6.02	0.0579	
			6.5575	123.4398		6.5538	1.1069		6.0236	0.0021	
			6.7064	129.8856		6.7027	1.2822		6.0308	0.0301	
			6.8589	99.1567		6.8444	0.6604		6.1289	0.0211	
			7.0042	92.3962		6.9933	0.2628		6.1362	0.0187	
			7.1458	101.3844		7.1422	-0.0422		6.1398	0.0451	
			7.2911	106.7404		7.2838	-0.0118		6.1507	0.0311	
			7.4255	114.476		7.4291	-0.0434		6.1725	-0.0013	
			7.5562	112.2614		7.578	0.0004		6.1906	0.0094	
			7.6979	113.9184		7.7196	0.0034		6.1979	0.0545	
			7.8322	108.2761		7.8649	-0.0554		6.2052	0.007	
			7.9702	90.5061		8.0138	0.0146		6.2088	0.0262	
			8.1119	89.7124		8.1555	-0.0089		6.3577	0.0565	
			8.2499	93.7377		8.2971	0.0291		6.503	-0.0129	
			8.3915	102.0905		8.4424	0.0155		6.6483	-0.0102	
			8.5332	105.1695		8.5877	0.0168		6.7935	-0.0494	
			8.6821	63.6168		8.7293	0.0258		6.9388	-0.0581	
			8.8419	29.9999		8.8782	0.0459		7.0841	-0.0413	
			8.9908	34.4288		9.0235	-0.0136		7.2293	0.0046	
			9.1288	39.0787		9.1143	0.0492		7.3746	-0.0219	
			9.2632	25.5603		9.1433	0.0148		7.5272	0.0297	
			9.2813	14.9071		9.2922	-0.0146		7.6724	-0.0143	
			9.4012	17.7134		9.4411	-0.0441		7.8213	0.0206	
			9.5428	21.9899		9.5864	-0.0448		7.963	0.0077	
			9.6845	24.1002		9.7353	-0.0663		8.1119	-0.0608	
			9.8261	33.129		9.8842	2.2744		8.2608	-0.0691	
			9.975	38.8265		10.0331	12.1486		8.4097	-0.0192	
			10.1312	60.8409		10.1857	26.9736		8.5622	-0.0778	
			10.2765	77.6198		10.291	40.8746		8.7184	-0.0484	
			10.4217	88.2698		10.4181	57.2268		8.86	-0.0767	
			10.5634	100.4445		10.5634	91.4009		9.0126	-0.0163	
			10.7086	105.4707		10.7123	100.8104		9.1578	-0.0461	
			10.814	101.7067		10.8539	102.6444		9.2995	-0.024	
			10.8249	109.2216		10.9229	89.7838		9.452	-0.0214	
			10.9883	53.4178		10.981	70.4855		9.5356	0.0024	
			11.1735	162.8893		11.1299	83.2167		9.5392	-0.0873	
			11.3587	100.1183		11.2825	93.4382		9.5465	-0.0055	
			11.544	107.9263		11.4241	109.6108		9.6046	-0.0674	

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP013B Depth	CP013B Fluorescence	Potential Oil Thick (ft)	CP013C Depth	CP013C Fluorescence	Potential Oil Thick (ft)	CP014 Depth	CP014 Fluorescence	Potential Oil Thick (ft)	CP015 Depth	CP015 Fluorescence	Potential Oil Thick (ft)
			11.7038	107.4951		11.573	123.3196		9.6191	-0.0607	
			11.8781	134.8227		11.7183	126.0449		9.63	-0.0431	
			12.0379	148.6389		11.8708	145.0234		9.6336	-0.0496	
			12.194	104.4354		12.0379	100.0654		9.6372	-0.0094	
			12.3575	84.645		12.1868	76.776		9.7607	-0.0085	
			12.5209	76.4661		12.3393	89.6604		9.906	0.1913	
			12.5609	93.1956		12.4156	88.8282		10.0622	0.0585	
			12.6371	110.7078		12.4882	71.3029		10.2038	0.1209	
			12.7969	152.3144		12.6371	56.7415		10.3491	16.0326	
			12.9604	169.5201		12.786	82.2212		10.5016	32.9369	
			13.1347	154.3125		12.9349	77.7993		10.6723	54.6377	
			13.3091	161.4183		13.0838	92.992		10.705	12.2694	
			13.487	207.2323	0.18	13.2291	122.7739		10.8357	23.3123	
			13.6504	170.7932		13.3744	124.2795		11.0101	66.0743	
			13.8139	166.8002		13.5269	30.913		11.1699	65.7125	
			13.9882	183.6989		13.6904	35.7344		11.3152	130.7707	
			14.148	167.08		13.8356	85.2138		11.4713	83.5854	
			14.3114	168.2961		13.9809	127.2154		11.6239	13.2305	
			14.4821	153.3332		14.1371	20.878		11.7909	13.4825	
			14.6564	228.6421	0.17	14.3005	5.0526		11.9544	15.2879	
			14.8235	177.9026		14.4603	7.342		12.0996	10.6762	
			14.9797	174.6918		14.6128	10.1086		12.2485	9.4121	
			15.1467	51.1334		14.7545	24.1942		12.4011	20.5712	
			15.3356	29.6637		14.907	31.7216		12.5427	17.739	
			15.5135	29.5587		15.085	23.1482		12.688	15.378	
			15.6842	31.5359		15.2448	28.5573		12.8369	12.215	
			15.844	26.1379		15.3937	80.4893		12.8877	15.9635	
			15.8477	10.4517		15.5571	116.658		12.8914	16.227	
			16.0002	12.4526		15.6988	127.9115		13.0294	12.7291	
			16.1673	8.7783		15.7024	69.088		13.1783	16.0162	
			16.3271	6.4762		15.706	70.2008		13.3272	28.6383	
			16.4978	0.7463		15.7896	65.6102		13.4761	19.3295	
			16.6793	0.234		15.9385	63.8583		13.6214	43.0743	
			16.8464	0.5465		16.091	36.8279		13.7775	45.0802	
			17.028	7.0098		16.2435	95.3525		13.9264	48.4045	
			17.1951	17.0518		16.3888	173.6793		14.0935	61.286	
			17.3621	25.8225		16.5486	161.3069		14.2424	72.2364	
			17.5437	36.9059		16.6866	180.0645		14.3877	114.0797	
			17.6999	27.9776		16.8355	68.9877		14.5329	107.7003	
			17.8561	24.5794		16.9917	39.4914		14.6897	38.7959	
			18.0159	39.1031		17.1442	73.4442		14.8598	25.6564	
			18.172	52.8435		17.2822	68.1835		15.0015	32.6458	
			18.3282	40.4279		17.4239	21.2236		15.1613	53.3556	
			18.4953	41.9849		17.5873	85.9077		15.3065	49.2988	
			18.6551	52.4616		17.758	79.7161		15.4554	36.4894	
			18.8294	62.8097		17.896	108.1737		15.6116	129.5596	
			18.9928	56.9387		18.0413	95.1832		15.7714	192.0769	
			19.1381	56.5971		18.1866	125.3623		15.9167	135.2025	
			19.2289	49.1801		18.3246	134.0746		16.0728	86.3546	
			19.4032	27.2731		18.4626	188.6469		16.1891	26.3196	
			19.5812	42.7828		18.6042	195.6391		16.2726	42.2766	
			19.7446	21.5445		18.7495	26.58		16.4215	24.2755	
			19.9044	71.4757		18.9057	34.2224		16.5704	19.4508	
			20.0679	56.4955		18.971	31.1476		16.7157	6.9325	
			20.2385	147.0338		19.08	39.1142		16.8682	9.0707	
			20.4129	144.7784		19.2289	25.7817		17.0099	5.192	
			20.5799	15.0129		19.3778	27.1205		17.1588	0.8844	
			20.8124	11.8673		19.5158	40.0656		17.3077	0.5884	
			20.994	18.089		19.6611	33.2548		17.4529	0.6379	
			21.161	3.7088		19.8027	17.1009		17.5982	5.3694	
			21.4806	12.9575		19.9516	10.5897		17.7398	5.5762	
			21.6332	12.6822		20.1187	10.7874		17.8851	23.08	
			21.7821	9.7249		20.2676	9.554		18.0413	82.9151	
			21.931	6.5134		20.4092	9.7982		18.1866	49.3883	
			22.0835	13.1495		20.5509	11.5833		18.3318	11.6456	
			22.2251	3.2973		20.6925	9.8795		18.3355	7.3374	
			22.3668	0.3573		20.8305	18.7327		18.3464	8.8364	
			22.3704	0.3858		20.9867	22.927		18.3536	8.8031	
			22.5084	0.4522		21.132	11.9626		18.4154	23.7885	
			22.5157	0.7072		21.2736	7.2507		18.5534	8.1585	
			22.6646	0.5726		21.4225	5.1274		18.695	22.7225	
			22.8062	0.753		21.5642	7.0104		18.8367	11.8605	
			22.9552	0.5891		21.7131	4.1747		18.9928	9.0634	
			23.104	0.4396		21.8801	6.7197		19.1345	6.379	
			23.253	0.4818		22.0218	6.7349		19.2834	6.0636	
			23.3982	0.3233		22.1598	5.1966		19.4359	5.2021	
			23.5471	0.461		22.2724	5.1612		19.5158	5.0623	
			23.6815	0.3369		22.3922	4.2079		19.5776	6.2388	
			23.8232	0.4633		22.5448	38.7497		19.7301	7.435	
			23.9684	0.4531		22.6937	14.717		19.879	8.6894	
			24.1064	0.551		22.8389	15.2245		20.0279	4.047	
			24.2444	0.4003		22.9951	6.8621		20.1913	3.543	
			24.3897	0.6268		23.144	8.8346		20.3366	3.3854	
			24.5241	0.8495		23.3002	17.3527		20.4855	4.9218	

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP013B Depth	CP013B Fluorescence	Potential Oil Thick (ft)	CP013C Depth	CP013C Fluorescence	Potential Oil Thick (ft)	CP014 Depth	CP014 Fluorescence	Potential Oil Thick (ft)	CP015 Depth	CP015 Fluorescence	Potential Oil Thick (ft)
			24.6621	0.9265		23.4527	2.0417		20.6271	1.7019	
			24.8001	0.4702		23.6234	4.3582		20.7724	2.9352	
			24.9381	0.4301		23.7759	6.5154		20.9177	6.7263	
			25.0616	0.4081		23.9031	3.5896		21.063	3.9556	
			25.1924	0.2755		23.9394	4.2269		21.2119	1.4898	
			25.3122	0.3284		23.9539	5.4808		21.3608	2.578	
			25.3667	0.5264		24.0047	5.5254		21.5133	0.3458	
			25.4139	0.5538		24.0338	9.0413		21.6658	0.5691	
						24.0447	3.4649		21.822	0.5899	
						24.1355	1.5659		21.9673	0.6753	
						24.2699	1.0792		22.1198	0.6434	
						24.3316	0.8772		22.2724	0.7367	
						24.4769	0.8835		22.4213	0.7905	
						24.6185	0.804		22.5629	0.661	
						24.7674	0.8777		22.7046	0.6045	
						24.9091	0.8844		22.8317	0.4965	
						25.0507	0.8709		22.8353	0.5224	
						25.1924	0.7282		22.8389	0.5936	
						25.3267	1.2394		22.8426	0.5738	
						25.4647	0.656		22.8716	0.5854	
						25.581	0.6292		23.0169	0.5776	
						25.6354	0.3598		23.1658	0.5309	
						25.7807	0.3275		23.2711	0.566	
						25.926	3.7406		23.3329	0.614	
						26.0749	10.0085		23.4818	0.5482	
						26.2165	6.6512		23.627	0.5174	
						26.3509	7.328		23.7687	0.5448	
						26.478	6.6221		23.9103	0.5184	
						26.6015	8.8028		24.0556	0.4276	
						26.6959	5.1872		24.2045	19.2251	
						26.7431	9.8605		24.2844	6.3243	
						26.7468	8.4376		24.3352	1.0595	
						26.8085	6.6261		24.4805	1.9127	
						26.892	7.6951		24.6222	1.1975	
						26.9393	5.7666		24.7638	3.704	
						26.9683	5.7005		24.9127	4.758	
						27.0627	2.47		25.058	3.9289	
						27.1535	1.5742		25.196	4.4192	
						27.1899	1.4377		25.3485	7.3555	
						27.2008	1.6895		25.4974	5.7118	
						27.2661	1.1926		25.6427	4.5763	
						27.2807	1.2758		25.788	3.4594	
						27.3605	1.9742		25.9441	4.9044	
						27.3714	1.2213		26.0894	6.7471	
									26.1294	5.2769	
									26.1439	5.327	
									26.1475	6.8419	
									26.162	6.8	
									26.2783	1.3641	
									26.3001	2.4008	
									26.449	3.1709	
									26.5833	0.6634	
									26.725	0.4223	
									26.8557	0.125	
									26.9756	0.1097	
									27.0954	0.0965	
									27.2734	0.7042	
									27.3823	0.7148	
									27.4695	0.709	
									27.5785	0.7524	
									27.6765	0.8447	
									27.7128	0.6847	
									27.7964	0.4945	
									27.909	0.5644	
									28.0179	0.5348	
									28.1196	0.5705	
									28.1668	0.5736	
									28.2031	0.3925	
									28.2576	0.4758	
									28.2867	0.429	
									28.392	0.3842	
									28.4283	0.607	
									28.4537	0.7487	
									28.4683	0.6353	
									28.4719	0.6952	
									28.4792	0.73	
									28.4828	1.0785	
									28.5227	1.0072	
									28.5264	0.9151	
									28.5336	1.1378	
									28.6208	1.0675	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP013B Depth	CP013B Fluorescence	Potential Oil Thick (ft)	CP013C Depth	CP013C Fluorescence	Potential Oil Thick (ft)	CP014 Depth	CP014 Fluorescence	Potential Oil Thick (ft)	CP015 Depth	CP015 Fluorescence	Potential Oil Thick (ft)

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP016 Depth	CP016 Fluorescence	Potential Oil Thick (ft)	CP017 Depth	CP017 Fluorescence	Potential Oil Thick (ft)	CP018 Depth	CP018 Fluorescence	Potential Oil Thick (ft)	CP019 Depth	CP019 Fluorescence	Potential Oil Thick (ft)
0.1037	1.2828		0.042	1.1519		0.071	0.2901		0.0347	0.7931	
0.2417	1.1291		0.1836	1.367		0.2236	0.3295		0.1727	0.6044	
0.3834	0.8077		0.3253	1.1875		0.3688	0.3857		0.3144	0.553	
0.5214	0.4652		0.4633	1.2712		0.5141	0.2636		0.4524	0.1743	
0.6594	0.161		0.6085	0.8819		0.6557	0.0768		0.5867	0.1303	
0.801	0.0169		0.7465	1.2811		0.8083	-0.0701		0.7248	0.1031	
0.9354	0.0066		0.8882	1.6791		0.9572	-0.0542		0.8664	-0.0438	
1.0734	0.1037		1.0226	0.9588		1.1097	-0.0802		1.0008	-0.0034	
1.2078	0.0055		1.1678	0.1459		1.255	-0.0465		1.1424	0.0425	
1.3458	0.0216		1.3095	0.0341		1.4075	-0.0252		1.2804	0.0946	
1.4838	-0.0285		1.4547	0.0066		1.5564	-0.0282		1.4112	0.0741	
1.6254	-0.0315		1.5928	0.0143		1.7053	-0.0632		1.5492	0.0469	
1.7598	-0.0411		1.7308	-0.0361		1.8506	-0.0132		1.6908	0.0014	
1.8942	0.5088		1.8688	-0.0335		2.0032	0.0671		1.8252	-0.0496	
2.0431	0.4067		2.0068	-0.02		2.1521	0.3677		1.9596	-0.0318	
2.1847	0.1157		2.1412	-0.0594		2.2973	1.6509		2.0976	0.0366	
2.3228	0.0753		2.2828	0.0113		2.4499	1.9781		2.2392	0.0426	
2.4644	0.0121		2.4172	0.154		2.5951	2.1376		2.3772	-0.0092	
2.577	-0.0078		2.5552	0.1234		2.7404	1.4821		2.5189	-0.0525	
2.6424	-0.0363		2.6569	0.0613		2.7985	0.9122		2.6569	-0.0327	
2.7005	-0.0543		2.8348	0.0824		2.9547	0.9046		2.6787	-0.002	
2.7259	-0.0306		2.9729	-0.0504		3.1036	0.8822		2.7295	-0.0598	
2.7295	-0.0135		3.1145	-0.0132		3.2525	2.0868		2.8712	0.0111	
2.7332	-0.0478		3.1581	0.054		3.3941	2.6097		3.0128	-0.0025	
2.7586	-0.0053		3.2198	-0.0043		3.5467	0.9437		3.1544	-0.0363	
2.9002	0.0197		3.3578	0.0292		3.692	0.1232		3.2888	-0.0101	
3.0419	0.0757		3.4922	-0.0613		3.8372	0.0326		3.4305	-0.0254	
3.1799	-0.0014		3.6302	-0.0458		3.9861	0.0661		3.5757	0.0578	
3.3215	0.0067		3.7646	-0.0835		4.135	0.1215		3.7137	-0.0744	
3.4595	-0.0357		3.9026	-0.0951		4.2803	0.0349		3.8191	-0.0556	
3.6[illegible]	-0.0166		4.0442	-0.0769		4.4292	0.0024		3.997	0.0028	
3.7392	-0.0056		4.1822	-0.0259		4.5745	0.017		4.1423	0.0258	
3.8735	-0.0342		4.3203	-0.0674		4.7234	0.0339		4.2803	0.007	
4.0152	0.0229		4.4583	-0.0834		4.8687	0.0105		4.4292	-0.028	
4.1605	-0.0555		4.6072	-0.0825		5.0139	-0.0125		4.5817	0.0101	
4.2985	-0.0294		4.7452	-0.0532		5.1665	0.0402		4.7198	0.0005	
4.4328	-0.0053		4.8868	-0.0265		5.3154	-0.006		4.8687	0.0133	
4.5745	-0.0358		5.0248	-0.0487		5.4606	-0.0528		5.0139	-0.0404	
4.7089	0.0203		5.1665	-0.0475		5.6059	-0.0206		5.1592	0.0009	
4.8578	-0.0189		5.3045	0.0109		5.7548	0.0544		5.3045	-1E-04	
5.0139	0.0607		5.4534	-0.0636		5.9001	0.0218		5.4498	0.0229	
5.1519	0.2512		5.5987	0.0173		6.0163	0.0178		5.5914	-0.022	
5.29	0.3214		5.7403	-0.0349		6.0635	-0.0226		5.7367	0.0235	
5.4316	0.2914		5.8783	-0.0401		6.2124	-0.0201		5.8819	0.1712	
5.5805	0.2684		6.0236	0.0426		6.3613	0.0043		6.0091	5.8179	
5.7149	0.2365		6.158	0.0244		6.503	0.018		6.1507	50.8061	
5.8529	0.3406		6.3032	-0.0096		6.6555	-0.014		6.2996	106.2552	
5.9982	0.2317		6.4412	0.0359		6.8008	-0.0547		6.463	224.7249	0.16
6.049	0.1919		6.4558	0.0035		6.9461	-0.0636		6.6083	195.1429	
6.5284	0.1764		6.532	-0.0437		7.095	-0.0346		6.6991	187.3725	
6.5466	0.2465		6.67	0.0226		7.2511	-0.041		6.7972	192.727	
6.5901	0.2414		6.8081	-0.0553		7.4037	-0.0249		6.9388	220.0611	0.14
6.5938	0.2154		6.9497	-0.0382		7.5489	-0.0287		7.0841	192.1157	
6.5974	0.176		7.0514	-0.0009		7.7051	0.0152		7.2402	103.2194	
6.7064	0.1486		7.2293	0.0161		7.8504	-0.0187		7.3928	123.6984	
6.8444	0.0411		7.371	-0.002		8.0029	-0.0115		7.5381	153.7957	
6.9933	-0.0086		7.5126	-0.0174		8.1518	-0.0157		7.687	197.6313	
7.1349	0.003		7.6506	-0.0129		8.3044	-0.0559		7.8322	205.2176	0.15
7.2766	0.0977		7.7959	-0.0053		8.4496	-0.0045		7.9775	180.8511	
7.4218	0.3022		7.9412	-0.0459		8.5985	-0.0656		8.1228	173.5189	
7.5635	0.2902		8.0828	-0.0358		8.7511	-0.0405		8.2681	163.5247	
7.7087	0.258		8.2281	-0.0333		8.9	-0.0454		8.4097	195.8809	
7.8504	0.0211		8.3734	-0.0262		9.0525	-0.0027		8.5622	210.2802	
7.9957	0.0244		8.5114	-0.0232		9.2014	-0.0842		8.7111	229.4447	
8.1337	-0.0215		8.6567	-0.0569		9.2995	0.0015		8.86	199.6182	0.30
8.2753	-0.0501		8.8019	-0.0638		9.4557	-0.0464		9.0089	152.2294	
8.417	-0.0984		8.9436	-0.0699		9.6082	-0.0873		9.1651	177.5631	
8.5659	-0.0106		9.0816	-0.0122		9.7571	-0.0478		9.314	197.0867	
8.7039	-0.0517		9.2269	-0.0482		9.906	-0.0441		9.3176	174.9622	
8.8564	-0.0268		9.3685	-0.02		10.0585	-0.0686		9.3576	167.3329	
8.9944	-0.0651		9.5138	0.0153		10.2111	-0.015		9.5029	206.1219	
9.1397	-0.0359		9.6518	-0.0294		10.3563	-0.0138		9.6554	212.6524	
9.285	-0.0219		9.7571	0.0013		10.5089	-0.05		9.8007	210.9274	
9.4302	-0.0186		9.8116	-0.0467		10.6614	0.0223		9.946	245.4741	
9.5755	0.0401		9.8697	-0.029		10.8067	-0.0006		10.0985	246.6391	
9.7208	0.0623		9.8951	-0.0499		10.9556	0.1237		10.2547	258.3374	0.90
9.8661	0.0512		9.9932	-0.0853		11.1081	0.1174		10.3999	36.7337	
9.9024	0.1039		10.1203	0.0343		11.257	0.0548		10.5706	161.6572	
9.9823	0.0438		10.2655	0.0447		11.4096	-0.0061		10.7304	166.1147	
10.1275	0.0991		10.4072	0.0167		11.5585	0.0367		10.8866	42.1084	
10.2801	0.3982		10.5452	0.0324		11.7074	0.024		11.05	26.5054	
10.4217	0.4736		10.6905	-0.0409		11.8636	0.0572		11.2135	24.0253	
10.567	0.5955		10.8321	0.0287		12.0161	0.1018		11.3769	14.1393	
10.7159	0.739		10.9738	-0.0705		12.1614	0.0946		11.5294	13.1272	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP016 Depth	CP016 Fluorescence	Potential Oil Thick (ft)	CP017 Depth	CP017 Fluorescence	Potential Oil Thick (ft)	CP018 Depth	CP018 Fluorescence	Potential Oil Thick (ft)	CP019 Depth	CP019 Fluorescence	Potential Oil Thick (ft)
10.8648	0.4629		11.1154	0.0211		12.3139	0.408		11.682	13.5149	
11.0028	0.3535		11.2534	-0.0365		12.4664	1.0038		11.8345	10.2469	
11.1517	0.4445		11.3914	-0.0391		12.579	2.9656		11.9834	9.6759	
11.2897	0.6935		11.5367	0.0493		12.6662	2.7379		12.1359	6.1175	
11.4386	1.1517		11.6747	-0.0138		12.8224	2.5008		12.2921	7.1174	
11.5803	1.1094		11.8236	0.0078		12.9749	1.5473		12.4446	18.1313	
11.7255	0.7603		11.9616	0.0071		13.1311	2.162		12.5863	20.7195	
11.8636	0.9701		12.0996	0.0131		13.2763	12.8492		12.619	23.321	
12.0088	1.9919		12.2376	-0.0699		13.4325	10.0527		12.7098	60.7382	
12.1505	6.2519		12.3793	-0.0751		13.5814	15.5213		12.8623	45.378	
12.2994	15.7391		12.5173	-0.0337		13.7339	23.6157		13.0148	33.676	
12.4156	38.3685		12.6589	-0.0119		13.8865	39.5602		13.1637	44.8997	
12.5572	40.892		12.7969	-0.0638		14.039	62.7617		13.309	24.0616	
12.6916	33.5121		12.9422	0.0013		14.2133	36.4535		13.4688	9.7876	
12.8441	18.3539		13.0693	0.0272		14.384	12.3519		13.6177	7.4829	
12.993	9.3702		13.171	0.0083		14.5366	11.9829		13.7703	6.5299	
13.1383	4.0833		13.309	-0.0064		14.6819	15.1145		13.901	6.5154	
13.1492	2.5464		13.4507	-0.0124		14.8308	12.4962		14.0463	9.0222	
13.2836	3.5391		13.5887	0.0601		14.9724	9.0756		14.1952	12.7316	
13.4325	1.1246		13.7303	-0.009		15.1286	5.1919		14.3405	13.7985	
13.5742	0.1377		13.8756	0.0692		15.2847	8.6513		14.4785	8.9591	
13.7121	0.1118		14.0245	0.0831		15.43	11.8097		14.602	15.6419	
13.8538	0.0119		14.1661	0.0271		15.5789	8.8967		14.7545	18.6561	
13.9954	-0.0107		14.315	0.0712		15.7278	11.8157		14.878	13.8017	
14.1371	-0.0266		14.4567	0.0464		15.8513	4.5336		15.0087	14.5015	
14.2787	-0.0098		14.5983	-0.0109		15.9021	4.273		15.1504	24.4293	
14.424	0.0387		14.7436	0.0093		16.051	5.0851		15.292	16.3063	
14.5584	-0.0285		14.8852	0.0525		16.2	4.3547		15.4336	20.3556	
14.6964	-0.01		15.0232	0.0607		16.3452	2.1789		15.5898	33.743	
14.8344	0.0787		15.1613	0.0718		16.4869	0.5271		15.7206	20.09	
14.976	0.0371		15.3029	0.0214		16.6358	0.6011		15.7641	16.1974	
15.1104	0.7186		15.4445	0.1617		16.7774	0.3883		15.8331	10.3585	
15.2593	0.8564		15.5825	0.2555		16.93	0.2323		15.8985	8.4181	
15.4046	0.6164		15.7205	0.5448		17.0789	14.738		15.9276	7.2528	
15.5353	0.761		15.8586	1.4811		17.235	28.341		16.022	17.057	
15.6697	0.7143		15.9421	2.0152		17.4021	5.1813		16.0837	12.0938	
15.815	0.6572		15.9566	1.8317		17.5655	3.4409		16.1346	10.6912	
15.9602	19.5384		16.0656	2.182		17.7253	30.9429		16.269	15.2639	
16.0983	4.3255		16.1999	5.3853		17.8851	19.2215		16.3634	15.5672	
16.2399	7.8625		16.3343	6.8601		18.0413	7.0188		16.4106	21.215	
16.3706	13.4556		16.3961	6.753		18.1975	19.0705		16.5595	51.4977	
16.4324	14.0251		16.3997	5.855		18.3464	10.367		16.7084	47.2312	
16.436	13.257		16.4215	5.4471		18.5025	1.3973		16.8319	48.3574	
16.5595	56.3425		16.5522	5.9109		18.6623	0.8271		16.9917	35.9055	
16.6975	19.2893		16.6623	26.7993		18.8185	0.7268		17.137	72.6519	
16.8355	18.1834		16.7676	54.7312		18.9638	0.9261		17.2096	65.389	
16.9699	34.1842		16.8584	19.4535		19.109	1.0984		17.3149	9.787	
17.1115	28.1244		16.9928	31.6772		19.1308	0.5371		17.3621	12.7611	
17.2568	48.7189		17.1308	27.8078		19.2035	0.6609		17.4239	11.8239	
17.3839	38.183		17.2688	40.7282		19.327	0.3727		17.5692	9.2756	
17.3876	41.553		17.2906	15.7017		19.4541	0.1514		17.7144	8.1382	
17.4747	59.4825		17.4214	13.7511		19.5848	0.1599		17.8633	6.3693	
17.4784	58.324		17.5557	14.4911		19.7156	0.1786		18.0195	2.8114	
17.5219	58.2037		17.6974	35.9696		19.8572	0.2108		18.1757	2.4358	
17.6636	36.4734		17.8281	20.6913		19.9988	0.2626		18.3246	1.8089	
17.8125	45.9348		17.9661	44.5808		20.1187	0.25		18.4698	1.6102	
17.9541	9.0101		18.1005	16.194		20.1804	0.193		18.6115	1.1887	
18.103	17.0902		18.2422	31.1475		20.3148	0.2534		18.7604	1.3079	
18.2483	8.6839		18.3874	23.9214		20.4383	0.2755		18.9057	1.0347	
18.3972	10.1599		18.5291	21.7481		20.5654	0.3236		19.0437	0.7725	
18.5316	15.4796		18.6635	34.559		20.6853	4.0825		19.1272	0.6791	
18.6732	20.4855		18.8015	17.8729		20.8087	3.7737		19.1926	0.6435	
18.8112	14.9469		18.9358	22.273		20.9395	4.1963		19.3342	0.6441	
18.942	16.1016		19.0847	13.8448		21.0884	4.1908		19.4722	0.5938	
19.0909	7.5719		19.2191	36.7158		21.2155	5.3932		19.6066	0.7283	
19.2253	6.9865		19.3644	36.5717		21.3354	1.9933		19.7446	0.4579	
19.3596	4.6187		19.4661	33.4293		21.4661	2.6906		19.8826	0.7183	
19.5013	10.8805		19.5714	26.4177		21.586	1.6966		20.0206	1.1047	
19.6393	5.6693		19.7167	19.9397		21.7058	0.747		20.1586	1.8819	
19.7737	5.496		19.8619	15.2969		21.8256	7.2674		20.2894	31.6897	
19.8281	5.1209		20	10.3832		21.9491	17.4291		20.4419	34.7999	
19.9262	5.6796		20.1561	8.3386		22.0762	14.4807		20.5908	89.2562	
20.0679	5.8034		20.3196	6.6739		22.1634	9.3219		20.7652	195.2201	
20.2095	1.6011		20.4721	4.0838		22.167	8.4909		20.9177	108.8675	
20.3475	3.9073		20.6319	2.8072		22.2578	9.2172		21.0739	53.6167	
20.4964	13.3757		20.7772	3.6222		22.3232	15.0674		21.2663	22.761	
20.6562	4.7425		20.9188	0.9502		22.4285	10.5653		21.3862	11.1628	
20.8087	6.7043		21.0641	1.0664		22.5411	11.6646		21.4588	10.5952	
20.9504	7.1492		21.213	5.3346		22.6101	28.1804		21.6186	10.8276	
21.0884	4.1755		21.351	3.787		22.6828	10.6726		21.7675	6.2981	
21.23	3.7345		21.4854	0.8746		22.7118	8.712		21.9237	4.5258	
21.3753	3.336		21.6161	0.6875		22.7917	8.0464		22.1017	6.7172	
21.5315	1.693		21.7287	0.2581					22.2506	15.0014	
21.6768	1.1251		21.7977	0.1032					22.4067	27.3565	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP016 Depth	CP016 Fluorescence	Potential Oil Thick (ft)	CP017 Depth	CP017 Fluorescence	Potential Oil Thick (ft)	CP018 Depth	CP018 Fluorescence	Potential Oil Thick (ft)	CP019 Depth	CP019 Fluorescence	Potential Oil Thick (ft)
21.822	0.5846		21.8413	16.8603					22.4358	33.7844	
21.9564	0.3964		21.8849	19.5963					22.5302	29.6474	
22.0871	0.443		21.9285	13.3242					22.6864	21.6561	
22.2143	0.4623		22.012	3.8094					22.8389	7.7144	
22.3486	0.3694		22.1101	2.2904					23.0169	8.2001	
22.4757	0.3776		22.1682	1.3723					23.1803	6.6281	
22.6065	0.327		22.2045	2.2629					23.3329	2.9822	
22.7372	0.3841		22.2263	1.0306					23.5072	2.7065	
22.8643	0.3785		22.2299	4.5218					23.5726	0.948	
22.9951	0.3586		22.3171	3.2323					23.6307	0.9357	
23.115	0.3696		22.3461	2.7935					23.7687	0.9309	
23.1531	43.3555		22.3715	4.0419					23.8994	0.7031	
23.1912	23.569		22.3861	1.7176					24.0338	0.7376	
23.2239	31.0555								24.1137	0.7474	
23.2929	31.4743								24.2045	2.2266	
23.3692	44.1058										
23.489	43.4437										
23.6161	41.7071										
23.7396	16.3055										
23.8667	45.9884										
23.9394	40.1731										
24.0665	45.8506										
24.2045	4.3741										
24.3461	8.2609										
24.4732	3.1042										
24.5967	3.7033										
24.6803	2.2002										
24.8074	1.8412										
24.8183	2.5923										
24.851	1.8189										
24.8619	1.6814										

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP016	CP016	Potential	CP017	CP017	Potential	CP018	CP018	Potential	CP019	CP019	Potential
Depth	Fluorescence	Oil Thick (ft)	Depth	Fluorescence	Oil Thick (ft)	Depth	Fluorescence	Oil Thick (ft)	Depth	Fluorescence	Oil Thick (ft)

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP020	CP020	Potential	CP020A	CP020A	Potential	CP021	CP021	Potential	CP022	CP022	Potential
Depth	Fluorescence	Oil Thick (ft	Depth	Fluorescence	Oil Thick (ft	Depth	Fluorescence	Oil Thick (ft)	Depth	Fluorescence	Oil Thick (ft)
0.0383	0.6539		0.1154	1.5691		0.0202	1.0692		0.1037	0.1427	
0.1836	0.4007		0.2716	1.3425		0.209	0.8675		0.2381	0.3917	
0.3398	0.1564		0.4239	1.3471		0.4088	0.1848		0.3725	0.2318	
0.4887	-0.0059		0.5801	0.2494		0.6049	0.1068		0.5105	0.448	
0.6303	-0.0112		0.7363	0.2279		0.8119	0.1701		0.6485	0.0856	
0.772	-0.0363		0.8925	0.1108		0.9971	0.1483		0.7865	-0.0205	
0.9136	-0.0313		1.0448	0.0278		1.1933	0.0395		0.9245	-0.0177	
1.0552	0.0006		1.1971	0.1731		1.3857	-0.002		1.0661	-0.0233	
1.2005	-0.0479		1.3572	0.2253		1.5855	0.2572		1.2078	-0.0516	
1.3422	-0.0078		1.5056	-0.0207		1.7889	0.2459		1.3494	-0.0663	
1.4874	0.0178		1.6658	-0.0179		1.9923	0.2885		1.4874	-0.0282	
1.6291	-0.006		1.8298	-0.082		2.1956	0.2797		1.6218	-0.0354	
1.7743	0.0565		1.9938	-0.045		2.3881	0.003		1.7635	0.0257	
1.9269	-0.0104		2.15	0.0651		2.5842	-0.0217		1.9015	-0.0279	
2.0685	-0.052		2.3101	-0.044		2.6605	0.0143		2.0431	-0.0229	
2.2211	-0.0517		2.4663	-0.006		2.8385	-0.0632		2.1811	0.012	
2.3627	0.0059		2.6264	0.003		3.0382	0.0311		2.2937	-0.0838	
2.5116	-0.0439		2.7826	0.0135		3.2416	0.0666		2.4608	-0.0707	
2.6569	-0.0005		2.9427	1.1575		3.4268	-0.0345		2.606	-0.0506	
2.6641	-0.0377		3.0989	3.3147		3.6375	-0.0317		2.6859	0.0333	
3.1835	0.0701		3.2278	4.7921		3.8336	-0.0193		2.8131	-0.0217	
3.6484	-0.0164		3.3879	34.5511		4.037	-0.082		2.9583	-0.013	
3.7065	0.004		3.548	68.3375		4.2367	-0.0072		3.0963	-0.0043	
3.8554	0		3.7081	64.3125		4.4328	-0.0279		3.2416	0.0393	
4.0007	-0.0177		3.8682	54.7919		4.6326	0.2468		3.3869	0.0177	
4.1532	0.0031		4.0284	108.9425		4.8251	0.0404		3.5285	0.0999	
4.2985	0.0536		4.1885	60.2953		4.9667	0.3405		3.6702	0.3989	
4.4474	0.0604		4.3486	59.3792		5.0975	0.0616		3.8154	2.1968	
4.5963	0.0713		4.5087	62.6649		5.2972	0.1048		3.9534	1.5408	
4.7452	0.1853		4.6688	96.3409		5.4933	0.0559		4.1023	0.6715	
4.8905	0.1289		4.8367	123.9077		5.6822	0.0153		4.2476	0.4065	
5.043	0.6008		5.0242	119.4847		5.8856	0.0274		4.3856	0.3922	
5.1992	1.0089		5.1804	126.8342		5.9509	-0.0131		4.5273	0.3233	
5.2936	2.0312		5.3444	154.2649		6.0853	0.013		4.6725	0.2241	
5.3117	2.512		5.3834	144.2021		6.2342	0.3013		4.8142	0.2117	
5.4643	7.6634		5.4537	135.7835		6.394	4.36		4.9558	0.7593	
5.6168	12.4247		5.6138	129.0858		6.5466	25.169		5.1011	6.43	
5.7803	18.608		5.7778	86.8968		6.7136	79.6631		5.2427	9.8624	
5.9292	25.5395		5.9419	67.682		6.8843	116.9739		5.3408	9.8482	
6.0853	32.8832		6.0981	146.3608		7.0332	137.901		5.3481	12.8784	
6.2379	42.4086		6.266	264.7238	0.17	7.1894	141.3456		5.4933	17.5932	
6.4013	56.7926		6.4417	144.7004		7.3383	123.4957		5.6531	29.6396	
6.5502	48.3325		6.6096	191.5199		7.4872	105.9963		5.7984	94.1998	
6.5756	86.6972		6.7737	218.1691		7.647	48.2263		5.9582	179.2644	
6.6809	88.036		6.9377	210.5302		7.8322	23.5653		5.9873	98.5331	
6.8371	71.9793		7.0939	199.0322		7.992	53.1092		6.0999	64.5873	
6.9788	63.4097		7.254	220.7932		8.1518	95.531		6.2597	88.7146	
7.0223	50.6022		7.418	231.4127		8.3298	133.3307		6.4013	107.1101	
7.164	59.6894		7.5781	237.5284		8.4751	142.1283		6.5466	123.8683	
7.3129	41.7061		7.7343	255.7601		8.6131	137.6351		6.6882	137.2568	
7.4654	41.8686		7.8983	220.3793		8.762	149.1861		6.8407	156.2784	
7.6143	31.5391		8.0545	211.7502		8.9073	165.6663		6.9969	173.6097	
7.7669	110.1736		8.2107	232.8682		9.0634	186.2151		7.0841	180.9719	
7.9303	63.0938		8.3709	235.4552		9.2269	169.0494		7.1858	167.0944	
8.0138	64.2354		8.5271	253.6283		9.245	70.3483		7.3274	185.0472	
8.1228	94.6218		8.6872	267.2423		9.2486	59.3854		7.4727	189.1956	
8.2789	134.2506		8.8473	278.4318		9.2523	56.2654		7.6143	185.735	
8.4387	165.6119		8.8746	252.6953		9.2777	62.1566		7.7523	176.698	
8.584	190.2221		8.898	221.6078		9.423	129.981		7.8976	184.8915	
8.7366	192.9518		9.0542	246.219		9.5755	139.7136		8.0392	189.754	
8.8709	207.6736	0.13	9.2144	237.9942		9.7208	140.5235		8.1773	188.9284	
8.9327	172.5063		9.3745	278.0599		9.8733	145.5798		8.3262	183.6109	
9.0779	204.2007		9.5307	288.438		10.0222	156.9668		8.4678	194.8773	
9.1942	217.5618		9.6869	308.7178		10.1711	168.9662		8.6131	227.1676	
9.3758	249.9562		9.8509	277.4964		10.3164	179.1849		8.7547	308.0656	0.14
9.5247	253.7008		10.011	217.3705		10.4653	175.5696		8.8964	181.402	
9.6699	244.0882		10.175	206.6271		10.6178	169.3674		9.038	173.2824	
9.8188	233.9478		10.3351	200.9356		10.7631	176.7944		9.176	182.7529	
9.9641	225.8952		10.4991	211.4097		10.9193	190.2715		9.285	188.2695	
10.113	235.2174		10.6553	210.8894	4.05	11.0863	181.3496		9.3285	138.4366	
10.2692	243.418		10.7842	75.4899		11.2353	182.7259		9.4702	193.8209	
10.2764	209.264	1.41	10.999	111.9716		11.3842	180.8605		9.6118	191.4448	
10.3527	196.2352		11.1552	71.9614		11.5367	193.4795		9.7571	194.2403	
10.5089	198.337		11.3114	120.7492		11.6892	101.6966		9.8951	187.6437	
10.6542	164.2476		11.4715	100.0349		11.8563	113.8538		10.0404	161.2004	
10.8103	172.5193		11.6043	55.1741		12.0052	89.4117		10.1857	157.9636	
10.9592	201.3168		11.8035	26.9742		12.1505	90.8289		10.3309	168.6325	
11.1118	216.9093		11.987	47.8908		12.3066	84.5066		10.4762	122.5151	
11.2643	235.2907		12.1471	76.8684		12.4737	92.5302		10.6215	101.5794	
11.4096	241.5743		12.3111	173.9085		12.4882	132.5072		10.7667	116.4081	
11.5585	220.2942	0.75	12.3697	290.1337		12.619	165.7274		10.9048	92.6252	
11.7074	194.1693		12.4088	198.1518		12.7642	138.9334		11.0464	82.4747	
11.8527	190.3153		12.5689	238.368		12.9132	92.2259		11.1917	93.0073	
12.0052	72.3013		12.7251	245.1703		13.0584	167.7806		11.3333	75.5638	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP020 Depth	CP020 Fluorescence	Potential Oil Thick (ft	CP020A Depth	CP020A Fluorescence	Potential Oil Thick (ft)	CP021 Depth	CP021 Fluorescence	Potential Oil Thick (ft)	CP022 Depth	CP022 Fluorescence	Potential Oil Thick (ft)
12.1359	97.1211		12.8813	218.6475	0.57	13.2182	250.4035	0.16	11.4786	59.8414	
12.3175	36.9564		13.0375	175.1273		13.3853	49.8114		11.6384	39.6027	
12.4955	30.7677		13.1937	166.6537		13.5487	35.2016		11.7764	69.3088	
12.648	91.1785		13.3538	116.1444		13.7194	55.2144		11.918	61.7466	
12.7969	107.7037		13.5256	147.5239		13.8647	103.0103		12.0633	80.5222	
12.9458	104.8568		13.6779	170.8642		14.0136	48.3118		12.2049	76.7248	
13.0984	30.7665		13.8419	276.3239		14.1661	19.7909		12.3466	92.3025	
13.2545	22.6189		14.002	282.2817		14.3405	14.3311		12.4919	118.8476	
13.4071	24.6057		14.1622	336.2992		14.5039	38.9321		12.5718	142.4401	
13.5669	63.7811		14.3223	187.6963		14.6637	53.7922		12.7061	175.0526	
13.6105	81.7596		14.4785	263.5861	0.80	14.8199	18.5924		12.8659	130.189	
13.7557	126.4685		14.6464	17.0468		14.9724	21.4097		13.0221	135.1883	
13.9119	149.8225		14.8182	2.2732		15.1213	17.5175		13.1674	166.6298	
14.0608	210.0733	0.15	15.0174	3.0042		15.2666	25.0311		13.309	159.6921	
14.2097	192.4353		15.1814	14.8676		15.4082	28.0697		13.4579	171.3085	
14.3586	147.9095		15.3454	24.8904		15.5535	32.838		13.5996	173.3178	
14.5112	180.7937		15.5094	21.8662		15.7024	23.6256		13.7448	164.3586	
14.6601	208.0293	0.15	15.6656	31.009		15.7714	17.3398		13.8901	136.6224	
14.809	195.8484		15.8218	35.0371		15.8259	19.8812		14.0354	66.8227	
14.9506	215.271		15.8765	14.5362		15.9675	12.7215		14.1807	41.6528	
15.0886	223.686	0.28	16.0054	10.0229		16.1164	13.7928		14.3405	86.9473	
15.2303	196.3895		16.1616	17.2421		16.2653	28.4486		14.4821	97.7295	
15.3755	71.8341		16.3139	10.2953		16.4106	16.2348		14.6274	133.1584	
15.5317	13.1845		16.3842	18.7619		16.5486	3.3922		14.769	144.9261	
15.6951	13.9846		16.5248	12.1573		16.6685	0.5134		14.7726	137.1754	
15.8513	8.2687		16.5872	7.9312		16.7774	0.2596		14.8671	119.6495	
16.0038	5.6756		16.7395	1.8273		16.9263	0.3466		15.0123	46.9332	
16.1564	7.7242		16.9035	8.8397		17.0171	0.2026		15.1721	66.4996	
16.3016	7.088		17.0598	13.0648		17.1624	0.2239		15.3174	144.8756	
16.4469	45.374		17.2199	22.8829		17.304	0.2202		15.471	196.6533	
16.6176	25.6726		17.3878	17.7183		17.4566	0.341		15.6298	175.076	
16.7665	1.9854		17.5518	10.9651		17.5982	0.2465		15.775	137.0891	
16.89	0.885		17.708	13.8189		17.7435	0.2066		15.8586	232.5854	
16.8936	0.8188		17.8642	27.1533		17.8851	0.3579		15.913	202.3439	0.14
16.9808	0.928		18.0165	15.6874		18.0304	0.3529		16.0583	85.8651	
17.1333	3.1594		18.1844	26.0605		18.1757	0.6535		16.2072	52.6967	
17.2822	4.2517		18.3445	24.2271		18.3209	0.6627		16.367	58.5602	
17.4275	2.2719		18.5046	11.3028		18.4698	1.2367		16.5123	58.9915	
17.58	0.9285		18.6609	10.5257		18.6151	0.9342		16.6539	49.1292	
17.7253	0.3569		18.8249	9.9803		18.7604	0.6258		16.7956	90.5963	
17.867	0.5466		18.9889	18.284		18.9057	0.6655		16.9372	94.7259	
18.0195	0.7587		19.149	3.2574		19.0546	0.3717		17.0789	78.5732	
18.1684	0.4941		19.3247	2.0369		19.1672	0.2161		17.2241	103.6561	
18.31	0.6052		19.3677	2.029		19.3233	0.1803		17.3694	125.7897	
18.4481	2.8629		19.4614	2.542		19.4686	0.1511		17.5074	176.7003	
18.5933	11.5125		19.6215	1.6918		19.6175	0.1261		17.6527	83.1834	
18.7422	8.8671		19.7777	0.5581		19.7664	0.0923		17.798	34.646	
18.8802	12.2875		19.9417	0.6402		19.9117	0.1428		17.9469	5.4567	
19.0291	8.2001		20.0979	0.6612		20.057	0.1312		18.103	17.8201	
19.1853	7.3435		20.2541	0.3813		20.2095	0.1379		18.2447	67.5493	
19.3451	3.1212		20.4104	0.5642		20.362	0.0895		18.3827	49.2537	
19.5049	3.5259		20.5548	0.6593		20.5073	0.1373		18.5316	43.6036	
19.6538	3.3102		20.6993	0.7046		20.6635	0.1547		18.6732	43.2847	
19.8027	1.7745		20.8516	0.7361		20.8051	0.2583		18.8149	19.3789	
19.9516	1.341		20.9883	0.7254		20.9467	0.1933		18.9565	16.2079	
20.0751	1.2135		21.1406	0.9868		20.9613	0.3368		19.08	18.2519	
20.2131	0.819		21.289	0.7117		21.1029	0.2387		19.1236	23.4339	
20.3039	0.3451		21.4413	0.996		21.2482	0.3015		19.2616	28.3534	
20.4601	0.6695		21.578	1.7874		21.3826	0.3039		19.4032	39.9321	
20.6054	0.6716		21.7147	1.2331		21.5278	0.2866		19.5158	64.532	
20.7615	0.5691		21.8592	1.0376		21.6622	0.3007		19.632	92.8604	
20.9068	0.6295		21.9958	0.8155		21.7966	0.1632		19.7664	35.3824	
21.0484	0.7349		22.1247	2.5181		21.9237	0.2336		19.908	11.6443	
21.1864	0.8202		22.2614	9.7317		22.0581	0.2346		20.0642	9.9481	
21.3208	1.2889		22.4137	7.4637		22.1852	0.1532		20.2095	7.3844	
21.4588	1.1989		22.5582	11.8449		22.3232	0.3497		20.3475	7.6385	
21.5932	1.2246		22.7105	7.9747		22.3377	0.3169		20.4819	7.2662	
21.724	1.0812		22.855	5.3079		22.4394	0.1217		20.6126	6.5608	
21.862	1.1087		22.8823	4.0096		22.592	0.0045		20.747	25.202	
21.9927	1.2678		22.9409	2.8343		22.73	0.0963		20.8886	11.6345	
22.1271	1.3003		23.0776	2.6707		22.868	0.2007		21.0266	31.8449	
22.276	1.0387		23.2064	3.3239		23.006	0.1403		21.1647	10.9283	
22.414	1.0582		23.3392	2.0328		23.1476	0.1328		21.3136	5.5766	
22.5556	9.1758		23.4563	9.1346		23.2856	0.		21.4479	4.726	
22.6937	36.2499		23.5345	7.1809		23.42	-0.041		21.5678	4.9923	
22.8389	113.7429		23.6086	5.0573		23.5617	-0.0287		21.6114	3.5565	
22.9806	45.1694		23.6243	5.8022		23.696	-0.07		21.655	6.9755	
23.075	64.0755		23.6594	8.5166		23.8304	-0.0534		21.7712	5.3988	
23.2384	11.3022		23.7531	5.3336		23.9648	-0.0928		21.8402	4.7009	
23.42	5.7849		23.7649	6.2317		24.0992	-0.0052		21.8874	4.542	
23.4454	4.6986		23.8	9.0338		24.2227	-0.0393		21.8947	5.5608	
23.4491	4.7848					24.3534	-0.0304		21.9164	10.6976	
23.4527	5.1331					24.4805	0.033		21.9346	12.7624	
23.5762	4.041					24.6004	-0.0591				

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP020 Depth	CP020 Fluorescence	Potential Oil Thick (ft	CP020A Depth	CP020A Fluorescence	Potential Oil Thick (ft)	CP021 Depth	CP021 Fluorescence	Potential Oil Thick (ft)	CP022 Depth	CP022 Fluorescence	Potential Oil Thick (ft)
23.7178	5.18					24.6113	-0.1284				
23.8558	5.4395					24.6548	-0.0263				
23.9866	3.1613					24.7311	0.0314				
24.1064	0.3077					24.7747	-0.0274				
24.1754	0.5414					24.8982	-0.0307				
24.219	5.5026					24.9309	-0.0438				
24.2335	1.7302					25.0434	-0.0376				
24.2953	3.0706					25.0798	-0.0594				
24.3825	2.2581					25.127	-0.0332				
24.4115	1.8892					25.1742	-0.0438				
24.4406	3.6612					25.1996	-0.0944				
24.4805	3.7681					25.2178	-0.1447				
24.4987	5.3432					25.2977	-0.0364				
24.5423	3.5428					25.3013	-0.1325				

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP020 Depth	CP020 Fluorescence	Potential Oil Thick (ft	CP020A Depth	CP020A Fluorescence	Potential Oil Thick (ft)	CP021 Depth	CP021 Fluorescence	Potential Oil Thick (ft)	CP022 Depth	CP022 Fluorescence	Potential Oil Thick (ft)

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP023 Depth	CP023 Fluorescence	Potential Oil Thick (ft)	CP024 Depth	CP024 Fluorescence	Potential Oil Thick (ft)	CP025 Depth	CP025 Fluorescence	Potential Oil Thick (ft)	CP025A Depth	CP025A Fluorescence	Potential Oil Thick (ft)
0.1219	0.0015		0.1291	0.8418		0.1328	2.54		0.0347	0.0636	
0.2708	0.0304		0.2671	1.3365		0.2671	0.5773		0.1763	0.0431	
0.4124	0.1907		0.4015	1.7484		0.4052	-0.0319		0.318	0.3061	
0.5541	0.1583		0.5359	2.912		0.5504	-0.0632		0.4633	0.2295	
0.6884	0.0844		0.6739	2.7111		0.6884	0.0635		0.5976	0.2182	
0.7538	0.0698		0.8155	1.7414		0.8155	0.1224		0.7356	0.0645	
0.7647	0.0946		0.9608	1.1294		0.91	0.0829		0.8773	0.122	
0.9172	0.1365		1.1097	0.4413		1.0444	0.2526		1.0153	0.2176	
1.0589	-0.0605		1.2586	0.2355		1.186	0.1193		1.1569	-0.0269	
1.2042	0.2669		1.4148	0.1608		1.3167	0.1927		1.3058	0.0077	
1.3494	0.1881		1.5601	0.0348		1.4075	0.5995		1.4511	0.1403	
1.4947	-0.0093		1.709	0.9406		1.5383	0.353		1.6	-0.0524	
1.6363	-0.0713		1.8579	2.5769		1.6654	0.0421		1.7344	-0.0067	
1.7889	-0.0657		2.0104	8.3404		1.7526	0.0763		1.8325	0.0542	
1.9378	-0.0933		2.1593	20.4852		1.7598	0.3209		1.8506	0.082	
2.0831	-0.0577		2.3082	27.2666		1.807	0.2438		1.8869	-0.0688	
2.232	-0.1316		2.4644	33.7403		1.8942	0.2907		1.9378	-0.0534	
2.37	-0.0356		2.6169	19.6445		2.0322	0.379		1.9741	-0.0506	
2.468	0.1181		2.7695	16.7567		2.1775	0.3047		1.985	-0.1224	
2.6169	0.1265		2.9111	11.0246		2.2683	0.3403		1.9995	-0.0734	
2.7658	0.1298		3.0636	6.5459		2.399	0.152		2.0504	-0.1616	
2.9147	0.0605		3.2089	6.8804		2.5516	0.1274		2.0649	-0.1255	
2.922	0.0422		3.3542	3.5754		2.6932	0.1383				
3.0164	-0.0616		3.5067	2.5637		2.8348	0.2755				
3.1617	0.0637		3.6665	3.962		2.9837	0.3195				
3.3142	-0.0206		3.8154	2.0811		3.129	0.214				
3.4595	-0.0655		3.9171	3.0175		3.2707	0.3787				
3.6084	-0.063		4.0733	5.3996		3.4014	0.6493				
3.7573	0.093		4.2258	9.2339		3.445	0.1641				
3.9099	-0.0133		4.3784	8.1497		3.5866	0.1391				
4.0588	-0.0647		4.5309	4.2017		3.7319	0.2825				
4.2077	0.0372		4.6762	11.0828		3.8808	0.0904				
4.3529	0.223		4.8287	24.6498		4.0297	0.0482				
4.5018	6.2158		4.9885	58.8074		4.1786	-0.0207				
4.658	1.5902		5.1338	41.0505		4.3312	0.0078				
4.8069	1.2896		5.2827	13.5438		4.4801	0.0314				
4.9558	-0.0873		5.4425	8.8092		4.6217	0.0069				
5.1047	-0.0653		5.5914	37.7302		4.767	0.147				
5.2573	-0.0516		5.7367	13.2301		4.9195	-0.0124				
5.4025	-0.0147		5.8856	11.8397		5.0612	-0.0602				
5.5514	-0.0181		6.0308	16.8113		5.2101	-0.0661				
5.5841	-0.0657		6.0526	21.277		5.3553	0.0608				
5.6313	-0.0311		6.0708	21.2013		5.4752	-0.0056				
5.7766	0.1838		6.2233	48.7424		5.5224	-0.026				
5.9292	0.1467		6.3831	90.255		5.6677	-0.0612				
6.0781	0.093		6.5248	132.0209		5.8166	-0.0515				
6.227	-0.0175		6.6664	135.3927		5.9655	0.0232				
6.3722	-0.0194		6.7282	112.6611		6.1144	-0.0016				
6.5284	-0.0501		6.8734	137.9079		6.2669	-0.0968				
6.6809	0.0276		7.0187	152.1089		6.4086	-0.0628				
6.8262	0.6348		7.1676	159.2649		6.5611	-0.0573				
6.9751	0.6589		7.3165	173.9765		6.7064	-0.1201				
7.124	0.3337		7.4582	182.144		6.8553	-0.0236				
7.2693	1.8891		7.6071	165.7338		7.0005	-0.0201				
7.4182	3.2885		7.7596	160.2334		7.1458	-0.061				
7.5635	7.4712		7.9085	146.3274		7.2911	-0.0869				
7.7051	17.4408		8.0501	171.8225		7.44	-0.0673				
7.8685	25.807		8.2027	272.6095	0.15	7.5925	-0.0316				
8.0175	18.5995		8.3516	176.9023		7.7378	-0.0874				
8.0974	21.4061		8.4932	122.1369		7.8831	-0.0372				
8.13	34.4914		8.6458	34.61		8.0356	0.0461				
8.2862	82.134		8.8092	67.0615		8.1882	-0.0418				
8.4424	100.622		8.9508	121.8618		8.3298	-0.0115				
8.6022	190.9486		9.0961	144.1076		8.4823	0.0012				
8.7475	235.2182		9.245	168.4319		8.6349	0.0395				
8.8092	260.7989		9.3285	170.9612		8.7002	0.0444				
8.8927	249.5544		9.4048	139.0724		8.831	-0.0242				
9.038	238.3969		9.5573	173.4437		8.9908	-0.0313				
9.1833	280.1616		9.7026	181.8361		9.1397	0.0341				
9.3394	181.0961		9.8552	192.9942		9.285	0.015				
9.4883	228.1644		10.0259	211.9485		9.4339	0.3821				
9.6409	232.6224		10.1384	205.9397		9.5864	5.0462				
9.797	259.5678		10.3164	214.4411		9.7389	5.1606				
9.946	314.005		10.4653	223.3668		9.8878	11.0278				
10.0985	341.7413		10.6142	235.2098		10.044	56.3115				
10.2619	283.1533		10.7595	240.4075		10.2002	130.7613				
10.4145	282.9368		10.9048	258.6669		10.2256	142.3922				
10.5597	323.8639	1.96	11.0573	146.2547		10.2474	111.4054				
10.7123	68.8898		11.2135	225.8405		10.3927	157.0565				
10.8866	4.9311		11.3587	263.3353	1.50	10.5379	166.2328				
11.0428	4.6896		11.504	111.9972		10.6796	101.5096				
11.2026	8.8436		11.6493	180.3575		10.8212	62.5703				
11.3696	14.1637		11.7946	225.0988		10.9592	34.9399				
11.4822	44.6331		11.9471	257.6689		10.9956	22.4037				

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP023 Depth	CP023 Fluorescence	Potential Oil Thick (ft)	CP024 Depth	CP024 Fluorescence	Potential Oil Thick (ft)	CP025 Depth	CP025 Fluorescence	Potential Oil Thick (ft)	CP025A Depth	CP025A Fluorescence	Potential Oil Thick (ft)
11.6674	29.4006		12.0924	194.955		11.05	145.074				
11.8127	14.8179		12.2413	211.6062		11.2098	64.8548				
11.9616	38.0706		12.3902	204.2838	0.74	11.3442	76.5583				
12.096	17.9451		12.5391	144.9992		11.3551	33.9719				
12.2376	11.5469		12.6044	163.8763		11.435	56.7727				
12.3865	19.0785		12.6371	152.3335		11.5657	27.5753				
12.5318	24.7712		12.7897	183.8018		11.5912	37.8751				
12.6807	28.3776		12.9386	191.4173		11.6565	52.4558				
12.8296	28.2423		13.0838	142.4807		11.7292	45.0924				
12.9785	30.811		13.2291	132.0502		11.8018	30.1152				
13.1274	32.7644		13.3817	152.5966		11.8054	25.8441				
13.2763	35.4577		13.5269	139.3222		11.8636	21.779				
13.4325	49.1143		13.6795	158.4964		11.889	24.4638				
13.5959	17.7554		13.8284	159.8978		11.9616	30.6155				
13.7521	20.7931		13.9736	151.7944		11.987	26.1857				
13.9046	14.228		14.1189	147.5532		12.0451	16.2543				
14.0535	13.9199		14.2715	189.8681		12.096	20.6542				
14.1988	9.7774		14.4167	242.1877		12.1359	26.5962				
14.3586	13.9285		14.5693	270.2126		12.1759	28.1578				
14.5075	7.6275		14.7182	225.7059		12.2231	17.0777				
14.6637	5.4359		14.8634	211.6665		12.2667	20.2627				
14.8271	5.0781		15.0087	201.4693		12.2776	25.3377				
14.9724	2.6652		15.1613	137.7362		12.3066	17.7151				
15.1213	1.7582		15.3102	157.7007		12.3321	16.3088				
15.2666	1.5317		15.4482	203.2294		12.3611	12.3532				
15.3864	2.1034		15.6007	211.3322	1.33	12.3793	15.5351				
15.4518	1.8969		15.7496	163.9612		12.3938	16.6805				
15.5716	2.7584		15.8876	136.8955		12.4156	18.1033				
15.608	5.8136		15.9021	174.8732		12.4229	20.0138				
15.7351	15.2595		16.0547	256.6898		12.4374	20.0054				
15.8767	8.8021		16.2072	239.1459		12.4555	19.8944				
16.0075	7.3567		16.3525	213.0458		12.4592	19.7113				
16.1382	12.8422		16.505	223.3746	0.60	12.4955	20.7057				
16.2653	6.1199		16.6539	129.5144		12.51	27.0896				
16.3997	6.0261		16.8101	81.0828		12.5391	32.7152				
16.5268	31.8965		16.9772	74.8774		12.5609	28.5412				
16.6539	42.9303		17.0462	26.866		12.5681	26.5901				
16.7992	11.0451		17.0498	13.4209							
16.8065	5.6565		17.0534	16.1491							
16.9045	7.7685		17.0825	82.2378							
17.0316	8.4218		17.2568	20.4053							
17.166	47.0501		17.4311	8.9549							
17.2931	62.3149		17.6018	12.6749							
17.4166	119.5635		17.7544	3.204							
17.5401	112.8237		17.9105	3.3292							
17.62	48.4991		18.0522	2.409							
17.6963	65.5271		18.1975	1.3955							
17.8306	55.2521		18.3427	1.3527							
17.9541	43.6443		18.4916	1.2117							
18.0849	16.5622		18.6369	0.9267							
18.2265	11.1199		18.7822	0.4909							
18.3573	15.1145		18.9275	0.2714							
18.4444	16.3451		19.0655	0.0041							
18.4844	41.6376		19.1563	-0.037							
18.6006	17.3295		19.2144	-0.0773							
18.6115	19.1875		19.3524	0.0835							
18.6151	44.3809		19.4323	-0.0868							
18.6878	90.9835		19.4395	-0.1441							
18.7822	68.1228		19.5812	-0.1616							
18.902	11.0515		19.7192	-0.0979							
18.9856	7.6184		19.8645	-0.1546							
19.0074	18.7779		20.0097	-0.0787							
19.109	8.8382		20.1514	-0.1141							
19.1817	13.4913		20.3039	0.0895							
19.2979	8.0662		20.4456	-0.0407							
19.3524	7.0039		20.5836	-0.0541							
19.4759	5.3417		20.7179	-0.0568							
19.563	4.3278		20.8632	-0.0535							
19.6066	4.2724		21.0012	0.0316							
19.6102	4.1025		21.1356	0.32							
19.7192	3.6247		21.2663	0.3609							
19.741	14.9437		21.3971	0.3797							
			21.5278	0.5317							
			21.6586	0.4222							
			21.7857	0.4743							
			21.9128	1.0428							
			22.0327	0.6148							
			22.1561	0.496							
			22.2796	0.4232							
			22.3123	0.1002							
			22.3486	0.1756							
			22.4721	0.1326							
			22.5665	0.1109							
			22.6682	0.0022							

Note *Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher*

CP023 Depth	CP023 Fluorescence	Potential Oil Thick (ft)	CP024 Depth	CP024 Fluorescence	Potential Oil Thick (ft)	CP025 Depth	CP025 Fluorescence	Potential Oil Thick (ft)	CP025A Depth	CP025A Fluorescence	Potential Oil Thick (ft)
			22.7881	0.0554							
			22.8716	0.0827							
			22.9733	-0.0256							
			23.0895	-0.0592							
			23.1186	-0.0729							

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP023 Depth	CP023 Fluorescence	Potential Oil Thick (ft)	CP024 Depth	CP024 Fluorescence	Potential Oil Thick (ft)	CP025 Depth	CP025 Fluorescence	Potential Oil Thick (ft)	CP025A Depth	CP025A Fluorescence	Potential Oil Thick (ft)

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP028 Depth	CP028 Fluorescence	Potential Oil Thick (ft)	CP029 Depth	CP029 Fluorescence	Potential Oil Thick (ft)	CP030 Depth	CP030 Fluorescence	Potential Oil Thick (ft)
0.1037	1.0961		0.071	0.7594		0.0274	3.6033	
0.2417	0.4698		0.2127	0.7761		0.1546	1.388	
0.3761	0.0975		0.3543	0.7042		0.2889	1.1932	
0.5105	0.0985		0.4923	1.5356		0.4197	1.1038	
0.6449	-0.0169		0.634	2.0703		0.5432	0.3851	
0.7792	-0.0308		0.7683	2.1262		0.6739	0.1044	
0.91	-0.01		0.8954	2.2311		0.801	0.0488	
1.0444	-0.0841		1.0262	3.5763		0.9354	0.0616	
1.186	-0.0433		1.1642	1.0691		1.0661	3.1236	
1.3204	0.0182		1.2986	0.3174		1.2005	1.2875	
1.462	-0.0187		1.4366	0.0656		1.3276	0.159	
1.6	-0.0435		1.5819	0.0748		1.462	0.1869	
1.738	-0.0426		1.7199	0.13		1.5928	0.2053	
1.8724	-0.0518		1.8579	0.0894		1.7235	0.117	
2.014	0.6978		1.9995	0.2963		1.8506	0.0262	
2.1521	1.0271		2.1448	0.011		1.9705	0.0186	
2.2864	0.7168		2.2792	0.0663		2.0976	0.0294	
2.4172	0.2343		2.4208	0.0917		2.2102	0.016	
2.5516	0.0363		2.5661	0.0947		2.3409	-0.0274	
2.6787	0.0173		2.606	0.13		2.468	0.0317	
2.8058	0.0097		2.7223	0.1756		2.606	0.0597	
2.8784	0.0458		2.8675	-0.0168		2.6315	0.0463	
2.8857	0.0394		2.9837	0.0475		2.7005	0.0322	
3.0201	0.1196		3.1617	0.0752		2.8239	0.0444	
3.1508	0.1702		3.307	0.0186		2.9511	0.0033	
3.2852	2.4987		3.4523	0.0028		3.0818	0.0224	
3.4268	26.218		3.6012	-0.0756		3.2126	-0.0774	
3.5757	56.8192		3.7392	-0.027		3.3433	-0.0107	
3.6048	60.3192		3.8663	-0.0624		3.4668	-0.0098	
3.7355	41.1456		3.9934	-0.0314		3.6012	-0.0269	
3.8808	9.5571		4.1278	-0.0319		3.7319	1.4264	
4.0261	18.276		4.2549	-0.033		3.8626	2.6632	
4.1677	1.9317		4.3893	-0.0134		4.0007	1.69	
4.3166	0.6962		4.5273	-0.044		4.1423	0.9537	
4.4728	0.1541		4.6616	-0.0248		4.2803	0.1952	
4.6108	0.185		4.8033	-0.0053		4.4147	0.0092	
4.7488	0.5745		4.9449	-0.0517		4.5563	-0.0091	
4.8905	0.6601		5.0793	-0.087		4.698	-0.0338	
5.0321	0.8663		5.2173	0.0582		4.836	-0.0959	
5.1774	0.5841		5.3553	0.0994		4.9849	-0.0586	
5.3226	0.3698		5.4933	0.1449		5.1265	-0.0818	
5.4643	0.2835		5.6386	0.3493		5.2718	-0.0523	
5.6059	0.1888		5.7875	0.0935		5.4207	-0.1	
5.7512	0.2369		5.8928	0.0751		5.5623	-0.0649	
5.8928	0.1016		5.9255	0.1004		5.7112	-0.077	
6.0308	0.1359		6.0708	0.179		5.8347	-0.0515	
6.1761	0.1073		6.2197	-0.0168		5.8456	-0.0107	
6.187	-0.0321		6.3722	-0.0004		5.9909	-0.0718	
6.1906	0.033		6.5211	0.0238		6.1325	-0.0364	
6.3287	0.0778		6.67	0.0176		6.2814	0.0652	
6.4594	0.0191		6.8226	0.151		6.4231	-0.0018	
6.5974	0.0373		6.9679	0.3284		6.5611	0.0148	
6.7318	0.0642		7.1277	0.5925		6.6955	1.8313	
6.8625	-0.0295		7.2766	1.4334		6.8335	1.1637	
6.9933	-0.0274		7.4255	4.2289		6.9642	1.0089	
7.1277	-0.0152		7.578	2.0579		7.0913	0.318	
7.2584	0.0591		7.7269	0.8642		7.2257	0.1548	
7.3964	0.0069		7.8722	0.5022		7.3565	-0.061	
7.5272	-0.0047		8.0247	0.4262		7.4945	-0.0384	
7.6579	0.0363		8.1736	1.317		7.6325	-0.0777	
7.7814	-0.0553		8.3189	0.8095		7.7705	-0.0367	
7.9049	-0.0722		8.4787	0.1742		7.9049	-0.0002	
8.032	-0.0886		8.6276	0.1474		8.0392	0.0341	
8.1664	-0.022		8.7765	0.0896		8.1773	0.0168	
8.2971	-0.0454		8.9254	0.1184		8.3153	-0.0215	
8.4279	0.0123		9.0743	0.0676		8.4496	-0.0674	
8.5622	-0.0579		9.176	0.0685		8.5913	-0.0904	
8.6966	0.0117		9.216	0.0178		8.7366	-0.0387	
8.8274	-0.0208		9.3612	-0.0126		8.8782	0.0178	
8.9654	-0.0537		9.5029	0.0011		9.0271	0.0213	
9.1034	-0.04		9.6481	-0.0158		9.1324	-0.0385	
9.2414	0.0132		9.7898	-0.0117		9.2087	-0.0685	
9.3758	-0.0446		9.9387	0.124		9.3503	-0.0877	
9.4992	-0.0233		9.9714	0.0496		9.4956	-0.0123	
9.5029	-0.009		10.0077	0.0875		9.6409	0.3081	
9.5392	-0.0651		10.1602	0.0925		9.7862	0.6314	
9.6736	-0.0928		10.3055	0.2437		9.9314	0.1446	
9.8116	-0.0228		10.458	0.6225		10.0767	0.0857	
9.9532	-0.0789		10.6069	2.6127		10.2256	0.0649	
10.0949	-0.0394		10.7486	4.5592		10.3781	0.0345	
10.2365	0.082		10.8975	2.864		10.527	-0.0628	
10.3781	0.066		11.0428	1.5836		10.6796	0.116	
10.5198	0.714		11.188	1.1945		10.8285	0.1076	
10.6614	2.9436		11.3406	0.7571		10.9738	0.1185	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP028 Depth	CP028 Fluorescence	Potential Oil Thick (ft)	CP029 Depth	CP029 Fluorescence	Potential Oil Thick (ft)	CP030 Depth	CP030 Fluorescence	Potential Oil Thick (ft)
10.8067	1.7534		11.4858	0.6463		11.1227	6.6015	
10.9483	0.3553		11.6311	0.161		11.2716	11.9838	
11.0936	0.1322		11.7837	0.1412		11.4314	23.6919	
11.2353	0.0513		11.9289	0.0294		11.6021	22.3059	
11.3769	-0.0501		12.0778	0.1272		11.751	33.3434	
11.5222	-0.0155		12.2304	0.0081		11.9035	30.666	
11.6602	0.0107		12.3793	-0.0412		12.056	28.6822	
11.8018	0.0381		12.4737	-0.023		12.2013	38.3628	
11.9398	1.686		12.6008	-0.0119		12.3575	69.6362	
12.0778	6.6689		12.7497	0.0258		12.4265	118.9457	
12.2195	4.67		12.8914	0.0354		12.5463	103.7825	
12.3611	3.5178		13.033	-0.0632		12.7061	89.8968	
12.5028	3.4668		13.1783	-0.0008		12.8696	110.101	
12.6408	2.5756		13.3235	-0.043		13.0366	83.2431	
12.786	2.5375		13.4652	0.1177		13.1928	89.1168	
12.8187	3.3328		13.6068	1.4815		13.3562	75.3336	
12.8369	2.997		13.7521	7.5188		13.516	71.2368	
12.8405	3.134		13.8937	18.8177		13.6722	83.5229	
12.8732	2.9148		14.0318	20.5739		13.8356	87.8931	
13.0148	1.2578		14.0463	18.536		13.9954	63.1618	
13.1565	0.3743		14.1916	19.2687		14.1734	31.6499	
13.2981	1.1465		14.3405	14.1127		14.3441	11.9279	
13.4325	0.6755		14.4821	11.0803		14.5329	2.0618	
13.5741	0.5067		14.6346	18.1448		14.7254	2.2794	
13.7158	0.3237		14.7872	32.4908		14.9143	11.8021	
13.8611	0.1542		14.947	55.8481		15.0777	41.4415	
13.9991	0.2808		15.0959	44.1676		15.2629	67.1075	
14.1443	0.1252		15.2412	51.7827		15.43	49.7122	
14.2896	0.0368		15.3901	54.0272		15.5971	118.8099	
14.4276	0.1005		15.5426	50.7808		15.7242	130.7885	
14.5693	0.2351		15.6951	58.8916		15.7278	87.6795	
14.7145	0.0592		15.7351	52.6131		15.7314	72.855	
14.8525	-0.0036		15.7532	52.3768		15.7351	80.28	
14.9978	-0.0009		15.7569	57.7105		15.8622	158.0765	
15.1431	0.0821		15.9058	65.6258		16.0256	187.8768	
15.2811	-0.0013		16.0656	126.4852		16.1927	194.1443	
15.4227	0.0131		16.2326	160.2817		16.3561	234.7735	
15.5644	-0.0108		16.3779	161.3312		16.5123	250.8937	
15.7024	-0.034		16.5268	129.6702		16.6721	274.8226	0.48
15.8331	-0.0329		16.6757	102.292		16.8319	169.8651	
15.9784	0.0576		16.8246	82.4607		16.999	41.9749	
16.1128	-0.0003		16.9772	72.4705		17.1842	51.0276	
16.1491	-0.0168		17.137	109.7928		17.344	39.2902	
16.1527	-0.0237		17.2822	130.2978		17.5074	70.3936	
16.2762	-0.0662		17.4275	59.6495		17.6745	23.3993	
16.4106	0.453		17.5764	65.7647		17.8597	17.3022	
16.5559	5.9638		17.7253	66.1263		18.0268	11.6572	
16.7011	21.3341		17.8742	56.9616		18.1938	4.5578	
16.85	50.589		18.0304	67.4692		18.3863	2.2899	
16.999	12.2242		18.1684	90.1231		18.5752	6.5169	
17.0099	2.1958		18.3137	73.0964		18.735	9.5115	
17.1261	0.5584		18.4517	126.6019		18.9093	18.9834	
17.2641	0.2168		18.5897	61.1817		19.04	18.5095	
17.4057	0.0548		18.7386	15.7659		19.0873	7.6414	
17.5474	-0.0478		18.8948	18.0153		19.2616	0.5995	
17.689	-0.0343		19.0328	12.7863		19.4541	0.3209	
17.8306	0.0543		19.0473	21.192		19.6211	0.4301	
17.9723	-0.0371		19.1381	21.4162		19.7773	0.3375	
18.1139	-0.0576		19.2797	28.8865		19.9589	0.3068	
18.2592	-0.005		19.4214	43.2079		20.1369	0.2887	
18.4081	-0.0351		19.5667	71.3708		20.3112	0.2997	
18.5534	0.7989		19.7047	43.3464		20.4673	0.2497	
18.695	11.5929		19.8463	27.1818		20.6235	0.2162	
18.8476	15.2647		20.0061	72.43		20.7869	0.3364	
18.9892	6.842		20.1477	85.4142		20.9467	0.3725	
19.1272	5.1797		20.2967	194.1615		21.2809	0.2788	
19.2725	3.9249		20.4347	144.8128		21.437	0.267	
19.4177	3.7053		20.54	119.992		21.5896	0.3203	
19.4577	2.6964		20.5581	91.366		21.6586	0.3059	
19.5921	2.8454		20.6962	90.0004		21.8148	0.366	
19.7337	3.1534		20.7034	201.1514	0.01	21.9637	0.3621	
19.879	2.8156		20.7143	91.9921		22.1198	0.2877	
20.017	2.7557		20.747	49.2744		22.2687	0.341	
20.1586	2.4228		20.7652	54.8263		22.3414	22.1551	
20.3039	2.0527		20.7833	44.2536		22.4503	53.9431	
20.4419	2.1069					22.6065	92.3172	
20.5872	2.1489					22.7736	74.6925	
20.7325	2.2843					22.9261	59.8464	
20.8705	2.1033					23.0932	31.6584	
21.0085	2.0011					23.2747	24.1431	
21.1501	1.7047					23.4345	37.2411	
21.2881	1.811					23.598	15.8974	
21.4225	1.718					23.7541	18.7338	
21.5678	1.8044					23.9176	30.6787	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness[1]

CP028 Depth	CP028 Fluorescence	Potential Oil Thick (ft)	CP029 Depth	CP029 Fluorescence	Potential Oil Thick (ft)	CP030 Depth	CP030 Fluorescence	Potential Oil Thick (ft)
21.7058	1.6763					24.0774	59.5327	
21.8474	1.5342					24.2408	91.6494	
21.9927	1.6168					24.4297	154.7267	
22.1344	1.4284					24.5895	110.0724	
22.2724	1.4764					24.7493	86.6484	
22.4104	1.7411					24.9163	80.4875	
22.5593	13.8023					25.0798	67.4486	
22.621	19.0307					25.2614	48.9659	
22.7481	70.44					25.4248	107.0864	
22.9188	136.1424					25.5846	97.0902	
23.0786	165.3639					25.6463	42.9856	
23.2312	147.065					25.6899	49.235	
23.3946	142.3022					25.8679	82.7838	
23.5653	99.8374					26.0495	64.3214	
23.7324	70.9708					26.2056	35.01	
23.9067	68.4384					26.311	34.1838	
24.0665	119.7509					26.3182	19.4492	
24.2299	88.6984					26.4635	17.1136	
24.397	57.2811					26.5942	26.16	
24.5677	28.5311					26.6996	17.034	
24.742	36.7703					26.7068	17.4288	
24.9127	66.2531					26.7141	18.4597	
25.0689	26.5395					26.725	21.7838	
25.2323	88.0753							
25.3921	98.0531							
25.5519	26.0012							
25.7081	12.8351							
25.8751	21.8997							
25.9332	6.6364							
26.0277	9.8449							
26.1657	1.0176							
26.3037	0.3647							
26.3872	0.4308							
26.3909	0.8899							
26.4417	0.499							
26.518	0.5958							
26.5724	0.7057							
26.6959	0.6846							
26.8339	0.4843							
26.9719	0.4197							
27.1317	0.5164							
27.2988	0.4558							
27.4622	0.7495							
27.6111	0.6868							
27.7709	0.8782							
27.9235	1.0364							
28.0651	1.2644							
28.2213	0.9713							
28.3738	1.0018							
28.4792	0.8398							
28.6644	0.4666							
28.8096	0.2381							
28.9477	0.2804							
29.082	0.1374							
29.1474	0.1336							
29.22	0.2356							
29.3435	0.2717							
29.4706	0.4476							
29.5723	0.4171							
29.6668	0.3161							
29.783	0.196							
29.9028	0.2782							
30.0299	0.1642							
30.0663	0.1401							
30.0699	0.2564							
30.1861	0.2064							
30.3205	0.6537							
30.4512	0.2811							
30.5638	0.1607							
30.6655	0.123							
30.7418	0.1626							
30.8398	0.2264							
30.8689	0.2841							
30.996	0.4288							
31.1231	2.4022							
31.2575	1.7994							
31.3955	2.048							
31.5444	1.9028							
31.6933	1.466							
31.8459	1.4846							
31.9875	1.0806							
32.1291	0.3467							
32.2599	0.0681							
32.387	0.0882							

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP028 Depth	CP028 Fluorescence	Potential Oil Thick (ft)	CP029 Depth	CP029 Fluorescence	Potential Oil Thick (ft)	CP030 Depth	CP030 Fluorescence	Potential Oil Thick (ft)
32.4633	0.2986							
32.594	0.2276							
32.7429	0.3571							
32.8955	0.23							
33.0407	0.1049							
33.1751	0.2808							
33.324	0.2148							
33.4584	0.1761							
33.5891	0.2197							
33.7308	0.2387							
33.847	0.1725							
33.9523	0.3363							
33.9668	0.2347							
33.9814	0.4842							
34.0939	0.3374							
34.1121	0.[illegible]318							
34.2174	0.4397							
34.2465	0.473							
34.3518	0.2906							
34.3772	0.3814							

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP031 Depth	CP031 Fluorescence	Potential Oil Thick (ft)	CP031A Depth	CP031A Fluorescence	Potential Oil Thick (ft)
0.0202	2.1098		0.0819	1.1756	
0.1691	2.5013		0.2054	1.3377	
0.3071	2.3863		0.3289	1.183	
0.4378	2.239		0.4524	0.7925	
0.5686	1.0552		0.5831	1.3799	
0.6957	0.9636		0.7139	0.3119	
0.8264	0.095		0.8446	0.5534	
0.9645	0.0731		0.9753	0.886	
1.0988	0.2168		1.1097	0.1589	
1.2296	0.1238		1.2405	0.0678	
1.364	0.1565		1.3676	0.0604	
1.4983	0.0459		1.4983	-0.1061	
1.6327	0.4669		1.6327	-0.0206	
1.7635	3.3947		1.7635	0.0945	
1.9051	4.4983		1.9051	0.0928	
2.0467	3.8781		2.0467	0.0993	
2.1847	2.3376		2.1884	0.0462	
2.3264	0.624		2.3264	0	
2.4717	0.2875		2.4789	-0.0322	
2.6097	0.163		2.6206	-0.064	
2.7114	0.3036		2.6641	0.0396	
2.8276	0.6186		2.7477	-0.008	
2.9692	1.0851		2.8966	-0.0258	
3.1145	0.6502		3.0419	-0.0303	
3.2561	0.2372		3.1908	-0.0303	
3.405	0.0654		3.336	-0.0148	
3.5467	0.0197		3.4849	-0.0208	
3.692	-0.0478		3.6266	-0.0034	
3.8372	-0.0601		3.7827	-0.1033	
3.9825	-0.0269		3.928	-0.0441	
4.1278	-0.0032		4.0733	-0.0334	
4.273	-0.0495		4.2149	-0.0251	
4.4219	-0.0548		4.3675	-0.0388	
4.5709	-0.0355		4.5127	-0.0035	
4.7161	-0.0181		4.6616	-0.104	
4.8578	-0.0311		4.8069	0.0454	
5.003	0.0102		4.9558	3.1392	
5.1519	-0.0706		5.0975	8.6806	
5.2936	-0.0542		5.2427	10.3848	
5.428	0.0281		5.3735	3.5658	
5.5623	-0.0399		5.4861	3.7404	
5.7004	-0.0791		5.6205	3.5093	
5.8311	0.0185		5.7548	0.9152	
5.9655	-0.0202		5.8856	0.6723	
6.0127	-0.0345		5.9509	0.5301	
6.1362	-0.0872		5.9546	0.3197	
6.2633	-0.0329		6.0781	0.3987	
6.3069	0.1141		6.2052	0.3999	
6.3214	0.1617		6.365	0.5409	
6.3287	0.1266		6.4812	0.7058	
6.3977	1.3621		6.5974	1.304	
6.503	3.4572		6.6483	3.2935	
6.6337	6.376		6.7463	3.7105	
6.7572	10.2001		6.8625	4.8542	
6.8843	24.4052		6.9788	3.9538	
7.0332	58.7711		7.095	3.0845	
7.1204	43.9126		7.2148	1.6889	
7.164	30.0184		7.3274	0.2951	
7.2875	26.1754		7.4473	0.4553	
7.3964	23.9674		7.5707	0.963	
7.4146	21.5284		7.6979	1.4223	
7.4727	16.2059		7.825	4.1851	
7.4836	12.1628		7.9485	2.5076	
7.5235	12.446		8.0501	2.3072	
			8.1555	3.2545	
			8.2898	3.6435	
			8.4242	5.2032	
			8.5622	5.7162	
			8.7002	3.8496	
			8.8346	8.2434	
			8.9763	22.9294	
			9.1179	18.8845	
			9.2196	9.0372	
			9.2523	6.4291	
			9.3975	6.086	
			9.5392	11.2523	
			9.6881	22.2278	
			9.8406	60.0521	
			9.9823	62.8935	
			10.1203	43.0975	
			10.2547	41.1872	
			10.2656	39.3059	
			10.4145	48.6719	
			10.5597	56.2992	

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

CP031 Depth	CP031 Fluorescence	Potential Oil Thick (ft)	CP031A Depth	CP031A Fluorescence	Potential Oil Thick (ft)
			10.705	63.2541	
			10.8539	62.1717	
			11.0028	78.6123	
			11.159	105.4419	
			11.3188	131.3662	
			11.4641	123.7131	
			11.6057	94.7407	
			11.7619	68.5169	
			11.918	70.207	
			12.0633	84.0604	
			12.2122	66.3773	
			12.3575	74.9734	
			12.4991	87.7478	
			12.5681	83.4567	
			12.7134	86.3429	
			12.8623	84.1884	
			13.0112	86.6738	
			13.1601	89.6649	
			13.3054	98.1912	
			13.4543	94.491	
			13.6068	96.5896	
			13.7557	101.1467	
			13.9046	115.1543	
			14.0572	158.2115	
			14.2097	110.5281	
			14.3623	33.365	
			14.5329	44.7637	
			14.6746	50.2666	
			14.8126	78.6075	
			14.9579	122.3424	
			15.114	182.8815	
			15.2666	222.9958	
			15.4082	204.0355	0.14
			15.5571	145.0153	
			15.6915	185.0097	
			15.7968	154.6644	
			15.8622	99.1976	
			16.0075	30.4068	
			16.1636	28.6186	
			16.3307	7.476	
			16.4905	2.8339	
			16.6467	2.6744	
			16.7956	3.1072	
			16.9445	6.7225	
			17.0898	5.8038	
			17.2423	6.5535	
			17.3912	7.7546	
			17.5437	45.303	
			17.7035	54.0274	
			17.7943	32.4737	
			17.9432	31.288	
			18.0885	28.5547	
			18.1902	26.5994	
			18.2919	18.7939	
			18.4335	20.3935	
			18.5715	21.5847	
			18.7132	23.7662	
			18.8548	26.558	
			18.9928	32.3155	
			19.0255	36.109	
			19.0873	21.4314	
			19.1708	19.0031	
			19.3161	24.1492	
			19.4577	15.4628	
			19.6066	36.076	
			19.7591	81.9956	
			19.9117	182.1243	
			20.0715	122.6063	
			20.2168	80.424	
			20.2458	76.6897	
			20.3402	49.7861	
			20.4964	44.4527	
			20.6598	58.2148	
			20.8087	32.5479	
			20.9831	28.0737	
			21.1538	10.4032	
			21.3245	26.5366	
			21.4806	32.551	
			21.6404	44.5921	
			21.8111	97.1113	
			21.9673	119.3591	
			22.1198	127.2356	
			22.2869	157.2521	
			22.3559	183.1226	

Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP031 Depth	CP031 Fluorescence	Potential Oil Thick (ft)	CP031A Depth	CP031A Fluorescence	Potential Oil Thick (ft)
			22.3922	187.1574	
			22.5484	106.5758	
			22.73	46.4921	
			22.9152	57.3996	
			23.0677	55.6221	
			23.2239	83.7046	
			23.3837	89.7837	
			23.5435	75.8549	
			23.7069	74.1514	
			23.8813	79.657	
			24.052	63.8239	
			24.2118	61.5832	
			24.3788	35.3086	
			24.5532	69.1353	
			24.7202	6.0246	
			24.8982	2.9119	
			25.058	2.0403	
			25.196	1.2391	
			25.3122	1.6537	
			25.3703	1.4093	
			25.4538	1.6024	
			25.4865	1.2524	
			25.5156	2.5633	
			25.5228	1.4044	
			25.5446	1.7876	

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Note: Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

Appendix B. ROST Fluorescence Data and Interpreted Potential Oil Thickness'

CP031 Depth	CP031 Fluorescence	Potential Oil Thick (ft)	CP031A Depth	CP031A Fluorescence	Potential Oil Thick (ft)

Note Shaded areas or areas of potential oil accumulation based on 200 fluoresence units and higher

APPENDIX C

OIL DENSITY DATA

CGC, Inc.

Construction · Geotechnical
Consulting Engineering/Testing

August 8, 1995
C95112

10

Mr. Ray Flynn
Geraghty & Miller
35 E. Wacker Drive, Suite 1000
Chicago, IL 60601

Re: Geotechnical Laboratory Test Results
CI0299.006 Rock Island

Dear Mr. Flynn:

As requested, we have completed geotechnical laboratory testing on the six bag samples and two jar samples submitted to us on August 3, 1995. The test results are presented in the enclosed Grain Size Distribution Test reports.

Specific Gravity Tests:

- Sample GM20D = .876
- Sample N-1-1 = .874

Should you have any questions concerning these results or require additional testing, please feel free to contact us. Thank you for allowing CGC, Inc. to be of service to you.

Sincerely,

CGC, INC.

Donald W. Arenander
Geotechnical Laboratory Coordinator

DWA/mes

Encl: As stated

ltr 94-c95112.dwa

1409 Emil Street, Madison, WI 53713
Telephone: 608/257-6377
FAX: 608/257-3479

NET® NATIONAL ENVIRONMENTAL TESTING, INC.

Bartlett Division
850 W. Bartlett Rd.
Bartlett, IL 60103
Tel: (708) 289-3100
Fax: (708) 289-5445

ANALYTICAL REPORT

Mr. Tim Burke
GERAGHTY & MILLER, INC.
35 E. Wacker Dr.
Suite 1000
Chicago, IL 60601

08/11/1995

NET Job No.: 95.05750

Job Description: CIO 299.006; Rock Island, IL.

Date Received: 08/03/1995 Time Received: 11:30

Parameter: Viscosity Analytical Method: D445 (2)

Sample Number	Date Taken	Sample Description	Results		Units	Batch No. Prep/Run	Date of Analysis	PQL	Analyst
315840	08/01/1995	GM-20D	4.18	S	CST.	7	08/09/1995		jpr
315841	08/01/1995	N-1-D	2.70	S	CST	7	08/09/1995		jpr

S : Parameter analysis was sub-contracted to another NET location

APPENDIX D

BORING LOGS/

WELL CONSTRUCTION DETAILS

FIELD BOREHOLE LOG

BOREHOLE NUMBER:

GM-A1

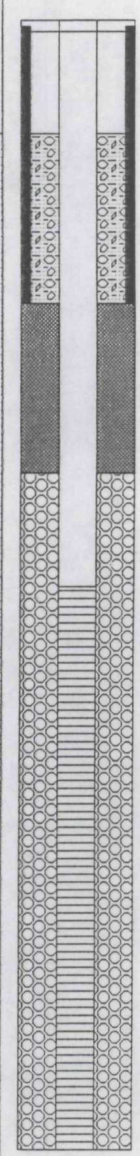
PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/20/96 DATE COMPLETED: 9/20/96

GROUND SURFACE ELEVATION (ft): 567.4
MEASURING POINT ELEVATION (ft): 569.37
TOTAL DEPTH (ft): 18
DEPTH TO WATER (ft): 14.2 (9/20/96)
SHEET: 1 OF: 1

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-16'	AU				NA	0.0	SAND (black, medium), (SP-SM), trace of silt, with some gravel, metal debris.
						1.0	
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
						12.0	
						13.0	
						14.0	
						15.0	
16-17'	SS	0.5	S		NA	16.0	
17-18'	SS	0.5	S		NA	17.0	SAND (black, medium), (SP-SM), to 17.8'.
						18.0	CLAY (black), (CH), soft, trace of silt.
						19.0	
						20.0	
						21.0	
						22.0	

LITHOLOGY

WELL INSTALLATION



Filename = GM-A1 DEM

FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-A2

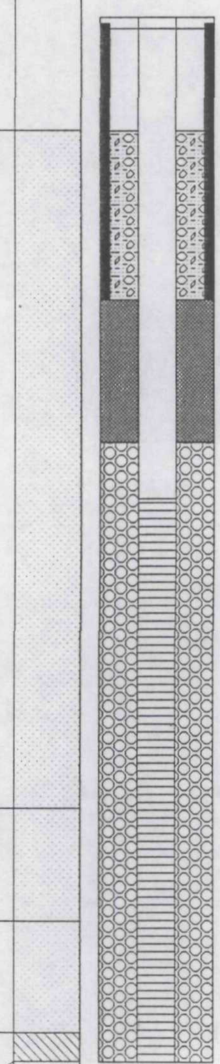
PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/20/96 DATE COMPLETED: 9/20/96

GROUND SURFACE ELEVATION (ft): 564.6
MEASURING POINT ELEVATION (ft): 566.40
TOTAL DEPTH (ft): 16.5
DEPTH TO WATER (ft): 11.1 (9/20/96)
SHEET: 1 OF: 1

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-12'	AU				NA	0.0	SAND (black to dark brown, medium), (SP-SM), trace of silt, loose, metal debris.
						1.0	
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
12-14'	SS	1.0	W		NA	12.0	SAND (grey, medium to fine), (SP), no gravel, loose.
						13.0	
14-15'	SS	0.5	S		NA	14.0	SAND (grey, medium to fine), (SP-SC), trace of clay, loose, no gravel.
15-16'	SS	0.5	S		NA	15.0	
16-16.5'	SS	0.5	S		NA	16.0	CLAY (black to dark grey), (CH), soft, medium plasticity.
						17.0	Filename = GM-A2.DEM
						18.0	
						19.0	
						20.0	
						21.0	
						22.0	

LITHOLOGY

WELL INSTALLATION



FIELD BOREHOLE LOG

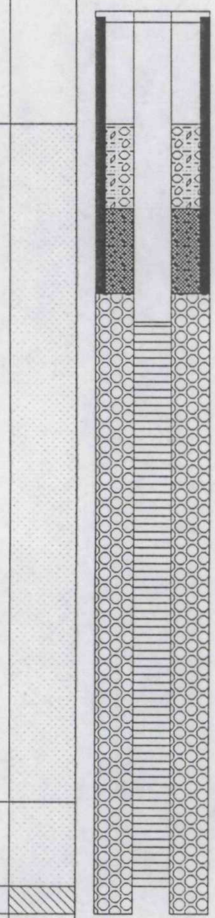
BOREHOLE NUMBER: GM-A3

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/20/96 DATE COMPLETED: 9/20/96

GROUND SURFACE ELEVATION (ft): 561.9
MEASURING POINT ELEVATION (ft): 563.71
TOTAL DEPTH (ft): 14.0
DEPTH TO WATER (ft): 9.5 (9/20/96)
SHEET: 1 OF: 1

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2 0	
						1 0	
0-12'	AU				NA	0 0	SAND (dark brown to brown, medium), (SP-SM), trace of silt, loose, no odor.
						1 0	
						2 0	
						3 0	
						4 0	
						5 0	
						6 0	
						7 0	
						8 0	
						9 0	
						10 0	
						11 0	
12-13'	SS	0 5	S		NA	12 0	SAND (grey, medium), (SP-SM), trace of silt, loose, no odor.
13-14'	SS	0 5	S		NA	13 0	CLAY (dark grey), (CH), soft, medium plasticity.
						14 0	
						15 0	Filename = GM-A3 DEM
						16 0	
						17 0	
						18 0	
						19 0	
						20 0	
						21 0	
						22 0	

LITHOLOGY | WELL INSTALLATION



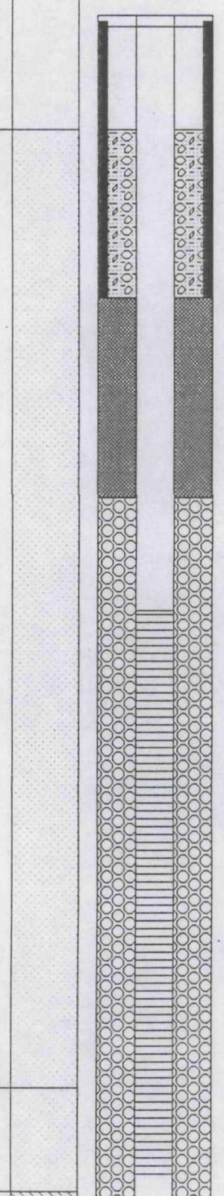
FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-B1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/24/96 DATE COMPLETED: 9/24/96

GROUND SURFACE ELEVATION (ft): 567.0
MEASURING POINT ELEVATION (ft): 568.92
TOTAL DEPTH (ft): 19.0
DEPTH TO WATER (ft): 14 (9/24/96)
SHEET: 1 OF: 1

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-14'	AU				NA	0.0	SAND (black to dark grey, medium to fine), (SP-SM), slightly silty to silty, loose, trace of subangular to subrounded gravel, trace of construction/industrial debris.
						1.0	
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
						12.0	
						13.0	
14-16'	SS		S		NA	14.0	
						15.0	
16-17'	SS		S		NA	16.0	
17-18'	SS		S		NA	17.0	SAND (black to dark grey, medium to fine), (SP-SM), slightly silty to silty, loose, trace of subangular to subrounded gravel to 18.8'.
18-19'	SS		S		NA	18.0	
						19.0	CLAY (dark grey), (CH), soft, medium plasticity.
						20.0	
						21.0	
						22.0	



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FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-B2

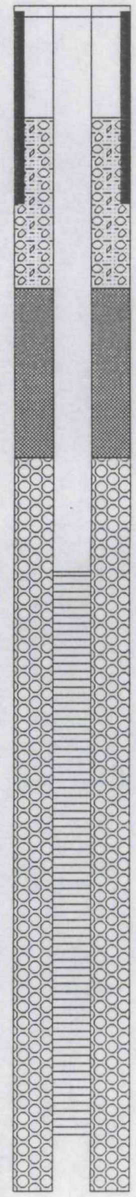
PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/23/96 DATE COMPLETED: 9/23/96

GROUND SURFACE ELEVATION (ft): 567.4
MEASURING POINT ELEVATION (ft): 566.90
TOTAL DEPTH (ft): 19.0
DEPTH TO WATER (ft): 14.5 (9/23/96)
SHEET: 1 OF: 1

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-15'	AU				NA	0.0	SAND (black to dark grey), (SP-SM), trace of silt, loose, strong odor, some gravel, some buried debris.
						1.0	
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
						12.0	
						13.0	
						14.0	
15-17'	SS	1.0	S		NA	15.0	SAND (dark grey, medium), (SM), some silt, strong odor, no gravel, loose.
						16.0	
17-18'	SS	0.5	S		NA	17.0	SAND (dark grey, medium), (SM), some silt, strong odor, loose to 18.5'.
18-19'	SS	0.5	S		NA	18.0	
						19.0	CLAY (black), (CL), soft, low plasticity, trace of silt.
						20.0	Filename = GM-B2.DEM
						21.0	
						22.0	

LITHOLOGY

WELL INSTALLATION



FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-C1

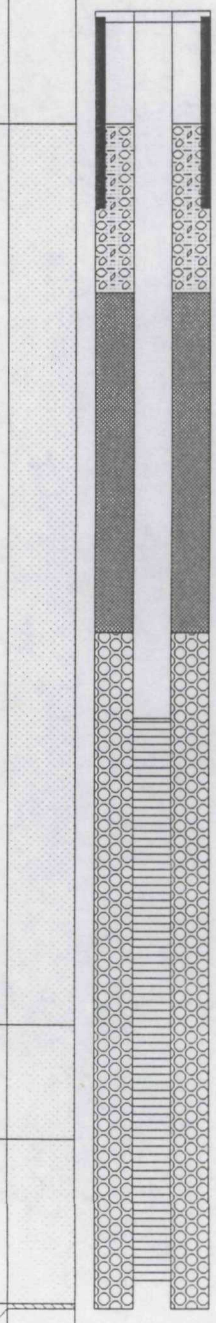
PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/23/96 DATE COMPLETED: 9/23/96

GROUND SURFACE ELEVATION (ft): 568.05
MEASURING POINT ELEVATION (ft): 567.54
TOTAL DEPTH (ft): 21.0
DEPTH TO WATER (ft): 15 (9/23/96)
SHEET: 1 OF: 1

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-16'	AU				NA	0.0	SAND (black to dark brown, medium to fine), (SM), silty, loose, some subangular to subrounded gravel, moderate odor.
16-18'	SS	1.0	S		NA	16.0	SAND (dark grey, medium to fine), (SSP-SM), trace of silt, no gravel, moderate odor.
18-20'	SS	1.0	S		NA	18.0	SAND (dark grey, medium to fine), (SM), silty, no gravel, moderate odor to 20.9'.
20-21'	SS	0.5	S		NA	20.0	
						21.0	CLAY (dark grey), (CL-CH), soft, medium plasticity, trace of silt.
						22.0	

Depth scale: 2.0, 1.0, 0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0

LITHOLOGY | WELL INSTALLATION



Filename = GM-C1 DEM

FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-C2

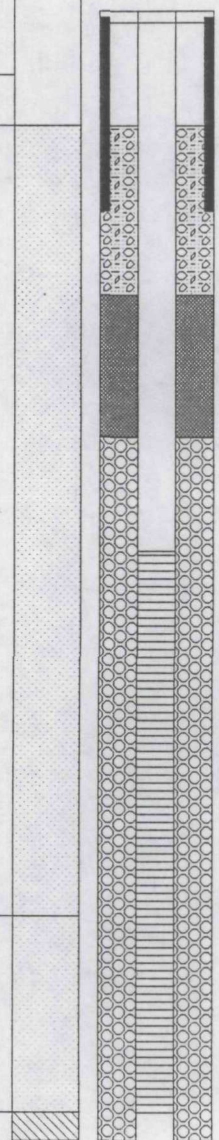
PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 10/1/96 DATE COMPLETED: 10/1/96

GROUND SURFACE ELEVATION (ft): 568.08
MEASURING POINT ELEVATION (ft): 567.71
TOTAL DEPTH (ft): 18
DEPTH TO WATER (ft): 17 (10/1/96)
SHEET: 1 OF: 1

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2 0	
						1 0	CONCRETE to 0.9'.
0-1'	AU				NA	0 0	SAND (black to dark grey, medium to fine), (SM), silty, loose, some subangular to subrounded gravel, some debris (iron slag).
1-14'	AU				NA	1 0	
						2 0	
						3 0	
						4 0	
						5 0	
						6 0	
						7 0	
						8 0	
						9 0	
						10 0	
						11 0	
						12 0	
						13 0	
14-16'	SS	1 5	W		NA	14 0	SAND (dark grey, medium to fine), (SP-SM), slightly silty, no gravel or debris to 17.5'.
						15 0	
16-18'	SS	1 0	S		NA	16 0	
						17 0	
						18 0	CLAY (dark grey), (CL), soft, low plasticity, silty.
						19 0	Filename = GM-C2 DEM
						20 0	
						21 0	
						22 0	

LITHOLOGY

WELL INSTALLATION



GERAGHTY & MILLER, INC.
Environment and Infrastructure
a heidemij company

FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-C3

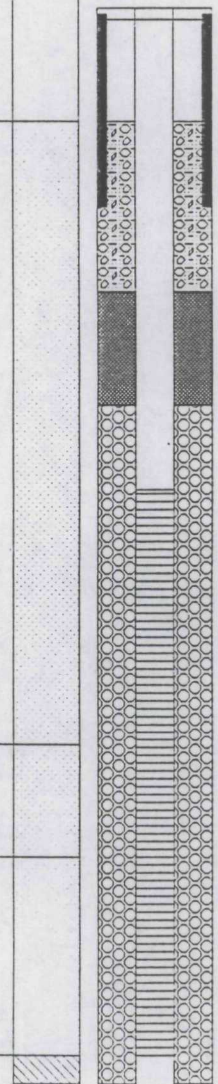
PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/20/96 DATE COMPLETED: 9/20/96

GROUND SURFACE ELEVATION (ft): 564.7
MEASURING POINT ELEVATION (ft): 566.49
TOTAL DEPTH (ft): 17.0
DEPTH TO WATER (ft): 14 (9/20/96)
SHEET: 1 OF: 1

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-10'	AU		D		NA	0.0	SAND (dark brown to dark grey, medium to fine), (sp-sm), lightly silty, trace subangular to subrounded gravel, loose.
						1.0	
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
10-11'	SS	0.5	M		NA	10.0	
11-12'	SS	0.5	M		NA	11.0	SAND (dark brown to dark grey, medium to fine), (sp-sm), slightly silty, no gravel, loose.
12-13'	SS	0.5	W		NA	12.0	
13-14'	SS	0.5	S		NA	13.0	SAND (dark brown to dark grey, medium to fine), (sp-sm), slightly silty, trace of gravel, loose to 16.5'.
14-15'	SS	0.5	S		NA	14.0	
15-16'	SS	0.5	S		NA	15.0	
16-17'	SS	0.5	S		NA	16.0	
						17.0	CLAY (dark grey), (ch-cl), silty, soft, medium plasticity.
						18.0	Filename = GM-C3 DEM
						19.0	
						20.0	
						21.0	
						22.0	

LITHOLOGY

WELL INSTALLATION



FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-D1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/24/96 DATE COMPLETED: 9/24/96

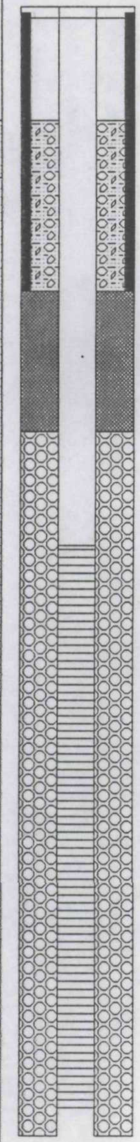
GROUND SURFACE ELEVATION (ft): 568.35
MEASURING POINT ELEVATION (ft): 570.15
TOTAL DEPTH (ft): 18.0
DEPTH TO WATER (ft): 16 (9/24/96)
SHEET: 1 OF: 1

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
0-1'	AU				NA	0.0	SAND (black, medium to fine), (SM), silty, loose, some subangular to subrounded gravel, some cinders, dry.
1-14'	AU				NA	1.0	SAND (black, medium to fine), (SM), silty, loose, some subangular to subrounded gravel, some industrial debris (iron slag, wire).
14-16'	SS	1.5	W	15	NA	14.0	SAND (dark grey, medium to fine), (SM), silty, medium dense, trace subangular to subrounded gravel, no debris.
16-17'	SS	1.0	S		NA	16.0	SAND (dark grey, medium to fine), (SM), silty, loose, no gravel, no debris to 17.5'.
17-18'	SS	1.0	S		NA	17.5	CLAY (dark grey), (CL), soft, low plasticity.

DEPTH scale: 2.0, 1.0, 0.0, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0

LITHOLOGY

WELL INSTALLATION



Filename = GM-D1 DEM

FIELD BOREHOLE LOG

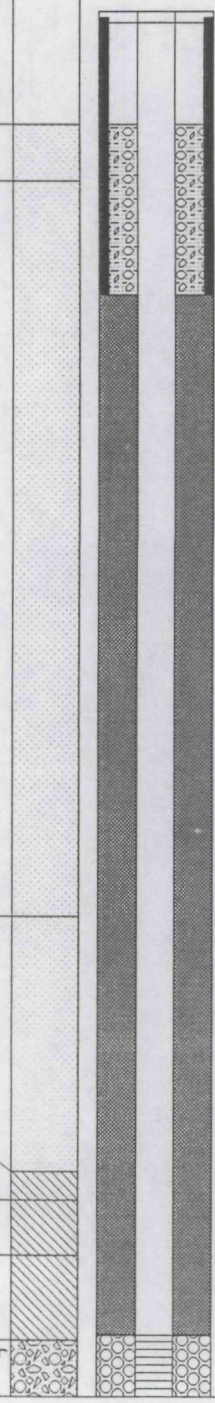
BOREHOLE NUMBER: GM-F1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/27/96 DATE COMPLETED: 10/4/96

GROUND SURFACE ELEVATION (ft): 566.7
MEASURING POINT ELEVATION (ft): 568.64
TOTAL DEPTH (ft): 31.8
DEPTH TO WATER (ft): 20.1 (10/1/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-1'	AU				NA	0.0	SAND (black, medium to fine), (SM), silty, with abundant cinders.
1-14'	AU				NA	1.0	SAND (black to dark grey, medium to fine), (SM to SP-SM), some subangular to subrounded gravel, some industrial debris (iron slag) was encountered from 8' bls to 11' bls.
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
						12.0	
						13.0	
14-16'	SS	1.5	W		NA	14.0	SAND (dark grey, medium to fine), (SM), silty, medium dense, strong petroleum odor, sheen on sample, no gravel or debris to 18.5'.
						15.0	
16-17'	SS	0.5	S		NA	16.0	
17-18'	SS	0.5	S		NA	17.0	
18-19'	SS	0.5	S		NA	18.0	CLAY (dark grey), (CH), very soft, medium plasticity, slight petroleum odor.
18.5-20'	SS	1.5			NA		
						19.0	CLAY (black to dark grey), (CL), soft, 3" sandy, clay lense @ 19.5 bls.
20-22'	SS	1.5			NA	20.0	CLAY (dark grey), silty, soft to 21.5' bls.
						21.0	
22-24'	SS	0.3	S		NA	22.0	GRAVEL AND SAND mixture, poorly sorted, subangular to subrounded, loose.

LITHOLOGY | WELL INSTALLATION



FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-F1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/27/96 DATE COMPLETED: 10/4/96

GROUND SURFACE ELEVATION (ft): 566.7
MEASURING POINT ELEVATION (ft): 568.64
TOTAL DEPTH (ft): 31.8
DEPTH TO WATER (ft): 21.4 (10/1/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION	LITHOLOGY	WELL INSTALLATION
						23.0	SAND (grey, medium to fine), (SP), some subangular to subrounded gravel, medium dense to 24.5' bls.		
24-26'	SS	1.5	S		NA	24.0			
							CLAY (grey), (CL), silty.		
						25.0	BOULDERS, limestone (grey-green), with abundant subangular to subrounded gravel, medium dense to dense.		
26-28'	SS	1.7	S		NA	26.0			
							SAND (brown), (SP), fine.		
						27.0	BOULDERS, limestone (grey-green), medium dense to dense.		
28-30'	SS	1.0	S		NA	28.0	SAND (grey, fine), (SP), with abundant limestone and gravel lenses to 29' bls. Refusal @ 29' bls.		
						29.0			
						30.0			
						31.0	Filename = GM-F1A DEM & GM-F1B DEM		
						32.0			
						33.0			
						34.0			
						35.0			
						36.0			
						37.0			
						38.0			
						39.0			
						40.0			
						41.0			
						42.0			
						43.0			
						44.0			
						45.0			
						46.0			
						47.0			

FIELD BOREHOLE LOG

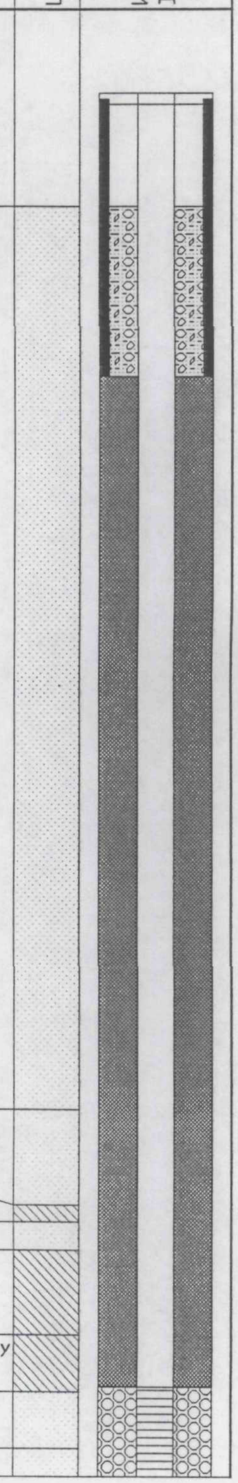
BOREHOLE NUMBER: GM-F2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 10/1/96 DATE COMPLETED: 10/8/96

GROUND SURFACE ELEVATION (Ft): 567.5
MEASURING POINT ELEVATION (Ft): 569.43
TOTAL DEPTH (Ft): 30.7
DEPTH TO WATER (Ft): 21.6 (10/8/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-16'	AU				NA	0.0	SAND (black to dark grey, medium to fine), (SM to SP-SM), silty to slightly silty, with trace of subangular to subrounded gravel, with some industrial debris (iron slag).
16-18'	SS	2.0	W		NA	16.0	SAND (dark grey, medium to fine), (SM), silty, with some subangular to subrounded gravel, loose, no odor to 17.7' bls.
							CLAY (dark grey), silty, soft, low plasticity.
18-20'	SS	1.0	S		NA	18.0	SAND (dark grey, fine), silty.
							CLAY (dark grey), silty, soft, low plasticity.
20-22'	SS	1.5	S		NA	20.0	CLAY (dark grey to black), soft, medium plasticity to 21' bls.
						21.0	SAND (grey, fine), (SP-SM), slightly silty, with trace of subangular to subrounded gravel, loose, sheen.
22-24'	SS	1.7	S		NA	22.0	SAND (grey, fine), slightly silty, with trace

LITHOLOGY / WELL INSTALLATION



	FIELD BOREHOLE LOG	BOREHOLE NUMBER: GM-F2

PROJECT NUMBER: CI0299.019
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 10/1/96 DATE COMPLETED: 10/8/96

GROUND SURFACE ELEVATION (ft): 567.5
MEASURING POINT ELEVATION (ft): 569.43
TOTAL DEPTH (ft): 30.7
DEPTH TO WATER (ft): 21.6 (10/8/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION	LITHOLOGY	WELL INSTALLATION
						23.0	of subangular to subrounded gravel, loose, sheen, medium dense.		
24-26'	SS	2.0	S		NA	24.0			
						25.0			
26-28'	SS	2.0	S		NA	26.0	SAND (dark grey, fine), (SP-SM), slightly silty, with abundant subangular to subrounded gravel, dense, no odor.		
						27.0			
28-30'	SS	1.5	S		NA	28.0			
						29.0			
						30.0			
						31.0	Filename = GM-F2A DEM & GM-F2B DEM		
						32.0			
						33.0			
						34.0			
						35.0			
						36.0			
						37.0			
						38.0			
						39.0			
						40.0			
						41.0			
						42.0			
						43.0			
						44.0			
						45.0			
						46.0			
						47.0			

FIELD BOREHOLE LOG

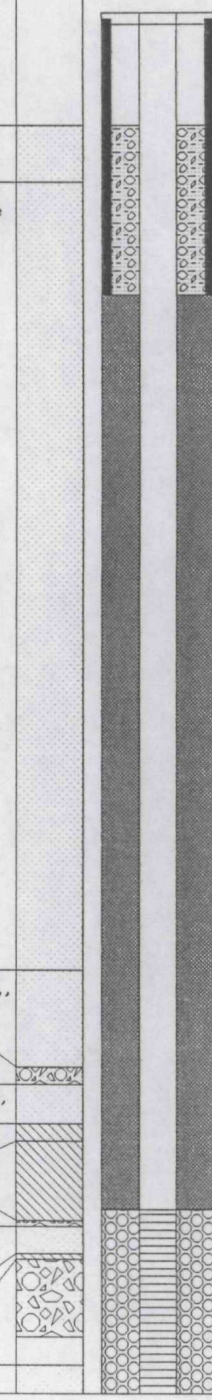
BOREHOLE NUMBER: GM-F3

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/27/96 DATE COMPLETED: 10/4/96

GROUND SURFACE ELEVATION (ft): 567.3
MEASURING POINT ELEVATION (ft): 569.27
TOTAL DEPTH (ft): 29.6
DEPTH TO WATER (ft): 22.4 (10/4/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-1'	AU	D			NA	0.0	SAND (black), (SM), silty, with some black cinders.
1-15'	AU				NA	1.0	SAND (black to dark grey, medium to fine), (SM to SP-SM), silty to slightly silty, with some subangular to subrounded gravel, also some industrial debris.
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
						12.0	
						13.0	
						14.0	
15-17'	SS	2.0	W		NA	15.0	SAND (dark grey, medium to fine), (SM), silty, with some subangular to subrounded gravel to 16.7' bls.
						16.0	GRAVEL seam saturated with free product from 16.7' to 17' bls.
17-18'	SS	1.0	S		NA	17.0	SAND (dark grey, medium to fine), (SM), no gravel, strong petroleum odor to 17.7' bls.
18-19.5'	SS	2.0	W		NA	18.0	CLAY (dark grey), (CL), soft, low plasticity. CLAY (dark grey), (CL), silty, soft to 19.4' bls.
19.5-21.5'	SS	1.0	S		NA	19.0	GRAVEL seam, subangular to subrounded.
						20.0	SAND (black, medium to fine), (SM), sheen, loose to 20' bls. CLAY (black), (CL), silty.
						21.0	BOULDERS, limestone (green-grey), medium dense, sheen on sample.
22-24'	SS	1.2	S		NA	22.0	SAND (dark grey, medium to fine), (SP-SM),

LITHOLOGY / WELL INSTALLATION



FIELD BOREHOLE LOG

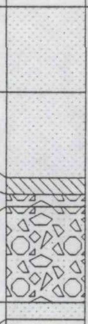
BOREHOLE NUMBER: GM-F3

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/27/96 DATE COMPLETED: 10/4/96

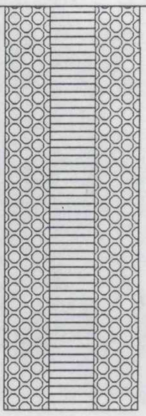
GROUND SURFACE ELEVATION (ft): 567.3
MEASURING POINT ELEVATION (ft): 569.27
TOTAL DEPTH (ft): 29.6
DEPTH TO WATER (ft): 22.4 (10/4/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						23.0	slightly silty, with trace of subangular to subrounded gravel, loose, strong petroleum odor.
24-26'	SS	1.5	S		NA	24.0	SAND (dark brown, medium to fine), (SP-SM), strong petroleum odor, loose to 25.5' bls.
						25.0	CLAY (dark grey), (CL), silty to 25.8' bls.
26-28'	SS	1.5	S		NA	26.0	BOULDERS, limestone (grey-green), refusal @ 26' bls.
						27.0	BOULDERS, limestone (grey-green), very dense to dense to 27.7' bls.
						28.0	SAND (grey, fine), dense.
						29.0	Filename = GM-F3A DEM & GM-F3B DEM
						30.0	
						31.0	
						32.0	
						33.0	
						34.0	
						35.0	
						36.0	
						37.0	
						38.0	
						39.0	
						40.0	
						41.0	
						42.0	
						43.0	
						44.0	
						45.0	
						46.0	
						47.0	

LITHOLOGY



WELL INSTALLATION



FIELD BOREHOLE LOG

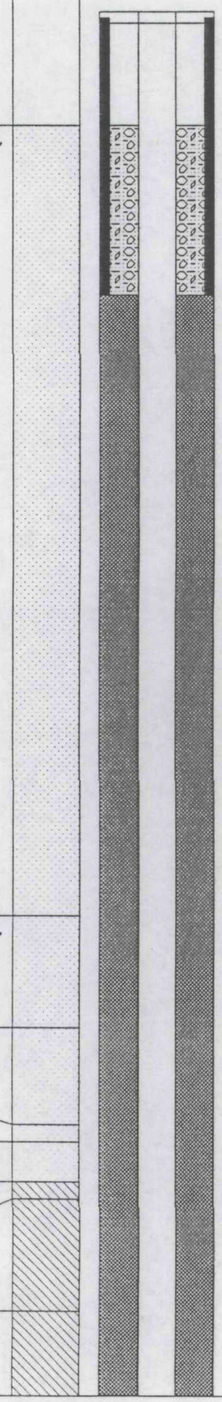
BOREHOLE NUMBER: GM-G1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/30/96 DATE COMPLETED: 10/7/96

GROUND SURFACE ELEVATION (ft): 568.19
MEASURING POINT ELEVATION (ft): 570.10
TOTAL DEPTH (ft): 33.7
DEPTH TO WATER (ft): 22.5 (10/7/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
0-14'	AU				NA	0.0	SAND (black to dark grey, medium to fine grained), (SM), silty, with some debris, no cinders.
14-16'	SS	2.0	W		NA	14.0	SAND (black to dark grey, medium to fine grained), (SM), silty, with some debris, no cinders, with several clayey sand lenses (1" to 2").
16-17'	SS	1.0	W		NA	16.0	SAND (dark grey, medium to fine), (SM), silty, no debris to 17.7' bls.
17-18'	SS	1.0	W		NA	17.0	SAND (brown, fine), (SP).
18-19'	SS	1.0	S		NA	18.0	SAND (dark grey, medium to fine), (SM), silty to 18.7 bls.
19-21'	SS	2.0	W		NA	19.0	CLAY (dark grey), soft, medium plasticity. CLAY (dark grey), (CL), silty, soft, sheen on sample.
21-23'	SS	2.0	S		NA	21.0	CLAY (dark grey), (CL), silty, very soft to soft, moderate odor.

LITHOLOGY / WELL INSTALLATION



FIELD BOREHOLE LOG

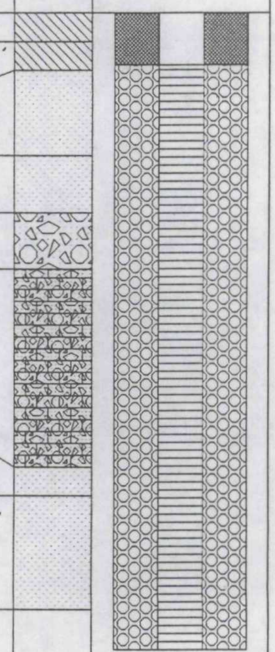
BOREHOLE NUMBER: GM-G1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/30/96 DATE COMPLETED: 10/7/96

GROUND SURFACE ELEVATION (ft): 568.19
MEASURING POINT ELEVATION (ft): 570.10
TOTAL DEPTH (ft): 33.7
DEPTH TO WATER (ft): 22.5 (10/7/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
23-25'	SS	1.0	S		NA	23.0	CLAY (dark grey), (CL), soft, slight odor to 23.5' bls.
						24.0	SAND (dark grey, medium to fine), (SM), silty, with abundant subrounded gravel, medium dense, slight odor.
25-27'	SS	1.0	S		NA	25.0	SAND (black, medium to fine), (SM), silty, with abundant subrounded gravel, medium dense, slight odor to 26' bls.
						26.0	BOULDERS, limestone (grey-green).
27-29'	SS	1.0	S		NA	27.0	SAND (grey), GRAVEL, AND LIMESTONE (fragments) mixture, medium dense, no odor, poorly sorted.
						28.0	
29-31'	SS	2.0	S		NA	29.0	
						30.0	SAND (light red, medium), (SP-SM), slightly silty, with some subrounded gravel.
31-33'	SS	1.5	S		NA	31.0	SAND (light red to grey, medium grained), (SP-SM), slightly silty, with some subangular to subrounded gravel.
						32.0	
						33.0	
						34.0	Filename = GM-G1A.DEM & GM-G1B.DEM
						35.0	
						36.0	
						37.0	
						38.0	
						39.0	
						40.0	
						41.0	
						42.0	
						43.0	
						44.0	
						45.0	
						46.0	
						47.0	

LITHOLOGY / WELL INSTALLATION



FIELD BOREHOLE LOG

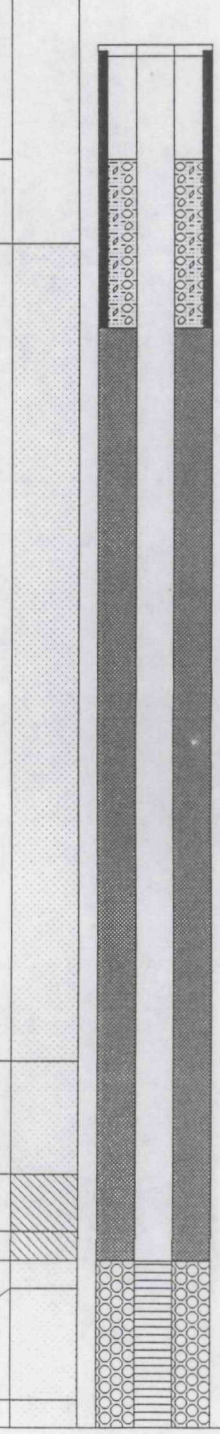
BOREHOLE NUMBER: GM-G2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/26/96 DATE COMPLETED: 10/3/96

GROUND SURFACE ELEVATION (ft): 568.3
MEASURING POINT ELEVATION (ft): 570.20
TOTAL DEPTH (ft): 29.7
DEPTH TO WATER (ft): 22.2 (10/3/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-1.5'	AU				NA	0.0	CINDERS (black), with some silty, fine sand.
						1.0	
1.5-16'	AU				NA		SAND (black to dark grey, medium to fine), (SM), silty, loose, slight petroleum odor.
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
						12.0	
						13.0	
						14.0	
						15.0	
16-18'	SS	2.0	W		NA	16.0	SAND (dark grey, medium to fine), silty, loose, slight petroleum odor.
						17.0	
18-19'	SS	1.0	W		NA	18.0	CLAY (grey), soft, medium plasticity.
19-20'	SS	1.0	S		NA	19.0	CLAY (grey), soft.
20-22'	SS	0.7	S		NA	20.0	SAND (grey, medium to fine), silty, with some abundant subangular to subrounded gravel, medium dense.
							SAND (black, fine), (SM), silty, with some gravel, saturated with product, dense.
						21.0	
22-24'	SS	0.5	S		NA	22.0	SAND (black, medium to fine), silty, with

LITHOLOGY / WELL INSTALLATION



FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-G2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/26/96 DATE COMPLETED: 10/3/96

GROUND SURFACE ELEVATION (ft): 568.3
MEASURING POINT ELEVATION (ft): 570.20
TOTAL DEPTH (ft): 29.7
DEPTH TO WATER (ft): 22.2 (10/3/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						23.0	abundant gravel (up to 2" diameter), strong odor, medium dense to dense.
24-26'	SS	1.5	S		NA	24.0	SAND (black, medium to fine), (SM), silty, with abundant gravel, medium dense to loose to 25.5' bls.
						25.0	
26-28'	SS	1.5	S		NA	26.0	CLAY (dark grey), silty, soft, strong odor.
							SAND (dark grey, medium), (SM), silty, loose to medium dense, 2" clayey sand lense @ 27'.
						27.0	BOULDERS, limestone (grey-green), dense.
						28.0	
						29.0	Filename = GM-G2A.DEM & GM-G2B.DEM
						30.0	
						31.0	
						32.0	
						33.0	
						34.0	
						35.0	
						36.0	
						37.0	
						38.0	
						39.0	
						40.0	
						41.0	
						42.0	
						43.0	
						44.0	
						45.0	
						46.0	
						47.0	

LITHOLOGY | WELL INSTALLATION

FIELD BOREHOLE LOG

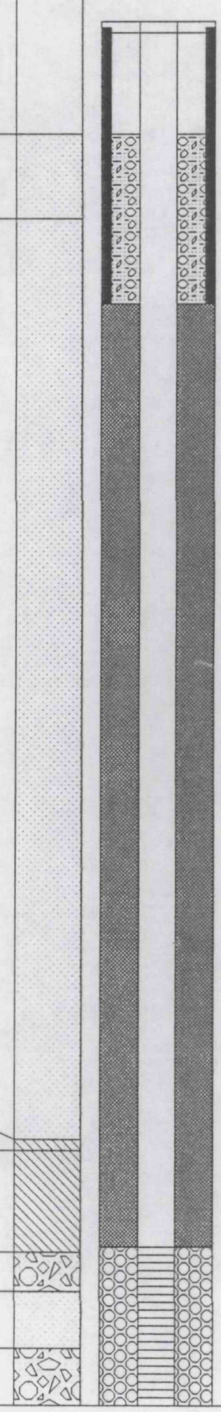
BOREHOLE NUMBER: GM-G3

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/26/96 DATE COMPLETED: 10/3/96

GROUND SURFACE ELEVATION (ft): 568.3
MEASURING POINT ELEVATION (ft): 570.21
TOTAL DEPTH (ft): 30
DEPTH TO WATER (ft): 22.2 (10/3/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-1.5'	AU				NA	0.0	SAND (black, medium to fine), (SM), silty, with abundant cinders.
1.5-16'	AU				NA	1.0	SAND (black to dark grey, medium to fine), (SM), silty, with some subangular to subrounded gravel to 17.8' bls.
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
						12.0	
						13.0	
						14.0	
						15.0	
16-18'	SS	2.0	W		NA	16.0	
						17.0	CLAY (dark grey), (CL), silty, soft, strong odor.
18-20'	SS	2.0	W		NA	18.0	CLAY (dark grey), silty, soft to 19.8' bls.
						19.0	
20-22'	SS	1.5	S		NA	20.0	BOULDERS, limestone (grey-green).
						21.0	SAND (grey, fine), (SP-SM), slightly silty, with some gravel to 21.5' bls.
							BOULDERS, limestone (grey-green).
						22.0	

LITHOLOGY / WELL INSTALLATION



FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-G3

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/26/96 DATE COMPLETED: 10/3/96

GROUND SURFACE ELEVATION (ft): 568.3
MEASURING POINT ELEVATION (ft): 570.21
TOTAL DEPTH (ft): 30
DEPTH TO WATER (ft): 22.2 (10/3/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION	LITHOLOGY	WELL INSTALLATION
						23.0			
24-26'	SS	2.0	S		NA	24.0	SAND (grey, fine), (SP-SM), slightly silty, no gravel, medium dense, moderate odor.		
						25.0			
26-28'	SS	2.0	S		NA	26.0	SAND (grey, fine), (SP-SM), slightly silty, no gravel, medium dense, moderate odor, 2" clayey sand lense @ 27' bls.		
						27.0			
28-30'	SS	2.0	S		NA	28.0	SAND (grey, fine), (SP-SM), slightly silty, no gravel, medium dense, moderate odor.		
						29.0			
						30.0			
						31.0	Filename = GM-G3A.DEM & GM-G3B.DEM		
						32.0			
						33.0			
						34.0			
						35.0			
						36.0			
						37.0			
						38.0			
						39.0			
						40.0			
						41.0			
						42.0			
						43.0			
						44.0			
						45.0			
						46.0			
						47.0			

FIELD BOREHOLE LOG

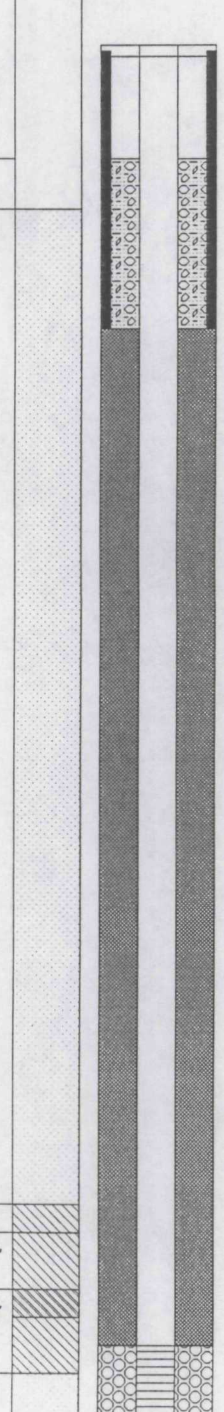
BOREHOLE NUMBER: GM-I1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/30/96 DATE COMPLETED: 10/7/96

GROUND SURFACE ELEVATION (ft): 567.83
MEASURING POINT ELEVATION (ft): 569.79
TOTAL DEPTH (ft): 31.3
DEPTH TO WATER (ft): 22 (10/7/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2 0	
						1 0	
						0 0	CONCRETE.
9"-16'	AU				NA	1 0	SAND (black, medium to fine), (SM), silty, with abundant gravel, debris to 18.5' bls.
						2 0	
						3 0	
						4 0	
						5 0	
						6 0	
						7 0	
						8 0	
						9 0	
						10 0	
						11 0	
						12 0	
						13 0	
						14 0	
						15 0	
16-18'	SS	2 0	W		NA	16 0	
						17 0	
18-19'	SS	1 0	W		NA	18 0	CLAY (grey), (CL), soft.
19-20 5'	SS	2 0	W		NA	19 0	CLAY (olive grey), (CL), silty, soft, strong odor, trace wood fragments
20 5-22'	SS	2 0	S		NA	20 0	CLAY (olive grey), (CL), silty, soft, strong odor, trace wood fragments, heavy sheen on sample to 21.5' bls.
						21 0	
22-24'	SS	1 5	S		NA	22 0	SAND (grey, medium to fine), with trace gravel, medium dense, sheen on sample

LITHOLOGY / WELL INSTALLATION



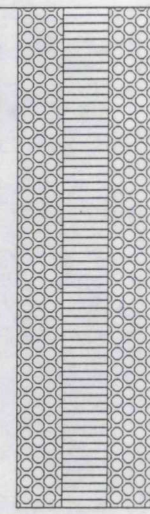
FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-I1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/30/96 DATE COMPLETED: 10/7/96

GROUND SURFACE ELEVATION (ft): 567.83
MEASURING POINT ELEVATION (ft): 569.79
TOTAL DEPTH (ft): 31.3
DEPTH TO WATER (ft): 22 (10/7/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION	LITHOLOGY	WELL INSTALLATION
						23.0			
24-26'	SS	1.5	S		NA	24.0	BOULDERS, limestone (grey-green), (SP), dense to 24.5' bls.		
						25.0	SAND (grey, medium to fine grained), (SP-SM), medium dense, abundant subangular to subrounded gravel.		
26-28'	SS	1.2	S		NA	26.0	SAND (grey, medium to fine grained), (SP-SM), medium dense, trace gravel, trace silt, 2" grey clay layer @ 27.7' bls.		
						27.0			
28-30'	SS	1.2	S		NA	28.0	SAND (grey, medium to fine grained), slightly silty, medium dense, trace subangular to subrounded gravel.		
						29.0			
						30.0	Filename = GM-I1A.DEM & GM-I1B.DEM		
						31.0			
						32.0			
						33.0			
						34.0			
						35.0			
						36.0			
						37.0			
						38.0			
						39.0			
						40.0			
						41.0			
						42.0			
						43.0			
						44.0			
						45.0			
						46.0			
						47.0			



FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-I2

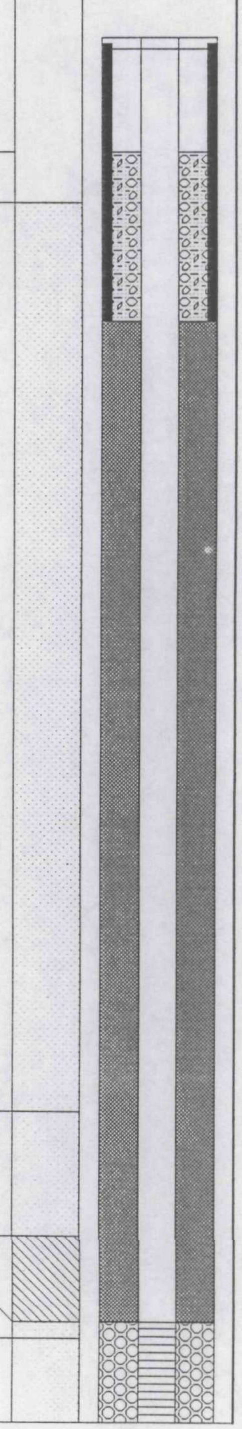
PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 10/1/96 DATE COMPLETED: 10/8/96

GROUND SURFACE ELEVATION (ft): 567.86
MEASURING POINT ELEVATION (ft): 569.67
TOTAL DEPTH (ft): 31
DEPTH TO WATER (ft): 22 (10/8/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-9"	AU				NA	0.0	CONCRETE.
9"-17'	AU				NA	1.0	SAND (black to dark grey, medium to fine), (SM to SP-SM), silty to slightly silty, with trace to some subangular to subrounded gravel, with trace industrial debris.
						2.0	
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
						12.0	
						13.0	
						14.0	
						15.0	
						16.0	
17-19'	SS	2.0	W		NA	17.0	SAND (dark grey, medium to fine), (SM), silty, with trace to some subangular to subrounded gravel, with trace industrial debris (iron slag) to 19.2' bls.
						18.0	
19-20'	SS	1.0	S		NA	19.0	CLAY (dark grey), (CH), soft, medium plasticity to 20.7' bls.
20-21'	SS	1.0	S		NA	20.0	SAND (grey, medium to fine), (SP-SM), slightly silty, loose, some subangular to subrounded gravel, sheen on sample.
21-23'	SS	2.0	S		NA	21.0	SAND (grey to brown, medium to fine), (SP-SM), slightly silty, medium dense, with abundant subangular to subrounded gravel to 27' bls.
						22.0	

LITHOLOGY

WELL INSTALLATION



FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-I2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 10/1/96 DATE COMPLETED: 10/8/96

GROUND SURFACE ELEVATION (ft): 567.86
MEASURING POINT ELEVATION (ft): 569.67
TOTAL DEPTH (ft): 31
DEPTH TO WATER (ft): 22 (10/8/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION	LITHOLOGY	WELL INSTALLATION
23-25'	SS	2.0	S		NA	23.0			
						24.0			
25-27'	SS	2.0	S		NA	25.0			
						26.0			
27-29'	SS	2.0	S		NA	27.0	SAND (grey, medium to fine), (SP-SM), slightly silty, medium dense, with some shell fragments, with some subangular to subrounded gravel, medium dense		
						28.0			
29-31'	SS	1.0	S		NA	29.0	SAND (grey, medium to fine), (SP-SM), slightly silty, medium dense, with some shell fragments, with some subangular to subrounded gravel, dense.		
						30.0			
						31.0			
						32.0	Filename = GM-I2A DEM & GM-I2B DEM		
						33.0			
						34.0			
						35.0			
						36.0			
						37.0			
						38.0			
						39.0			
						40.0			
						41.0			
						42.0			
						43.0			
						44.0			
						45.0			
						46.0			
						47.0			

FIELD BOREHOLE LOG

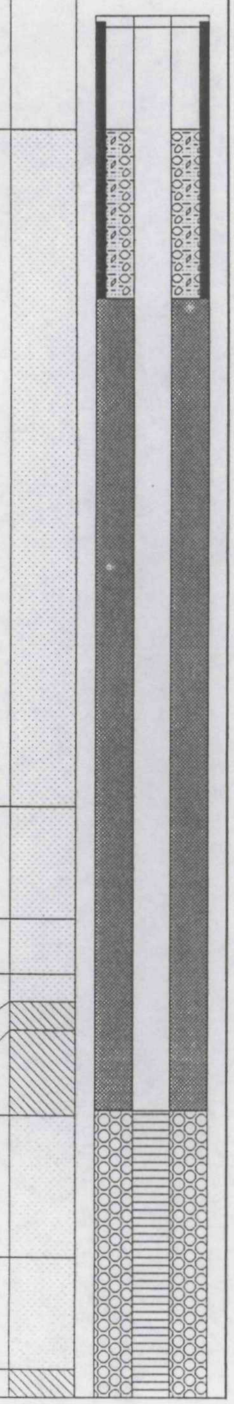
BOREHOLE NUMBER: GM-J1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/25/96 DATE COMPLETED: 10/3/96

GROUND SURFACE ELEVATION (ft): 564.6
MEASURING POINT ELEVATION (ft): 566.55
TOTAL DEPTH (ft): 27.7
DEPTH TO WATER (ft): 18 (10/3/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-12'	AU				NA	0.0	SAND (dark brown to black, medium to fine), (SP-SM to SM), slightly silty to silty, with subangular to subrounded gravel, loose.
12-14'	SS	2.0	D		NA	12.0	SAND (dark grey to black, fine), (SM), silty, loose, 6" gravel seam with free products @ 13' bls.
14-15'	SS	1.0	W		NA	14.0	SAND (dark grey to black, fine), (SM), silty, loose, no gravel seam with product, 1" piece of wood @ 14.9' bls.
15-16'	SS	1.0	S		NA	15.0	SAND (dark grey to black, fine), (SM), silty, loose, 6" gravel seam with very little product, with abundant wood to 15.5' bls.
16-18'	SS	2.0	S		NA	16.0	CLAY (dark grey to black), soft, moderate odor.
						17.0	CLAY (dark grey), soft.
18-20'	SS	1.5	S		NA	18.0	SAND (grey, medium to fine), (SM), silty, with some to abundant subangular to subrounded gravel, sheen on sample.
20-22'	SS	2.0	S		NA	20.0	SAND (grey, medium to fine), (SM), with trace subangular to subrounded gravel which grades into a silty clay @ 21.7' bls.
22-24'	SS	2.0	S		NA	22.0	CLAY (grey), silty to 23' bls.

LITHOLOGY / WELL INSTALLATION



FIELD BOREHOLE LOG

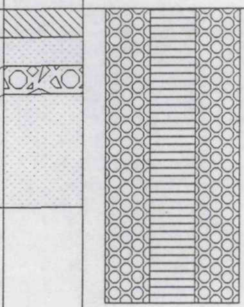
BOREHOLE NUMBER: GM-J1

PROJECT NUMBER: CI0299.019
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/25/96 DATE COMPLETED: 10/3/96

GROUND SURFACE ELEVATION (ft): 564.6
MEASURING POINT ELEVATION (ft): 566.55
TOTAL DEPTH (ft): 27.7
DEPTH TO WATER (ft): 18 (10/3/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						23.0	SAND (grey, medium to fine), (SP), with trace gravel.
24-26'	SS	1.0	S		NA	24.0	BOULDERS, limestone (grey-green), dense.
						25.0	SAND (grey, medium to fine), (SP), with trace gravel.
						26.0	
						27.0	Filename = GM-J1A.DEM & GM-J1B.DEM
						28.0	
						29.0	
						30.0	
						31.0	
						32.0	
						33.0	
						34.0	
						35.0	
						36.0	
						37.0	
						38.0	
						39.0	
						40.0	
						41.0	
						42.0	
						43.0	
						44.0	
						45.0	
						46.0	
						47.0	

LITHOLOGY | WELL INSTALLATION



FIELD BOREHOLE LOG

BOREHOLE NUMBER:

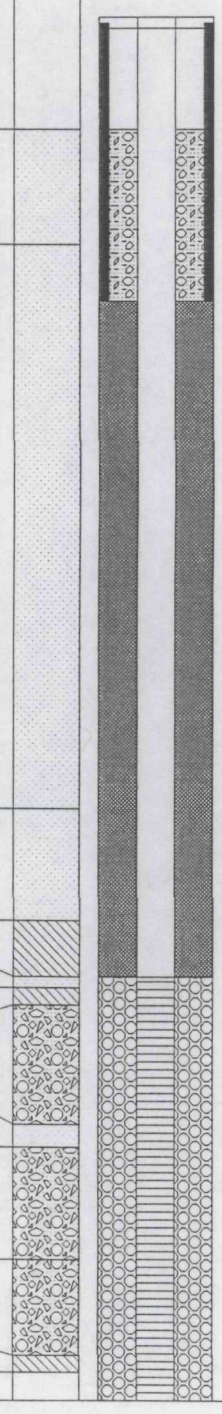
GM-J2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/25/96 DATE COMPLETED: 10/2/96

GROUND SURFACE ELEVATION (ft): 563.3
MEASURING POINT ELEVATION (ft): 565.31
TOTAL DEPTH (ft): 25.2
DEPTH TO WATER (ft): 24.8 (10/2/96)
SHEET: 1 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION
						2.0	
						1.0	
0-2'	AU				NA	0.0	SAND (black, medium to fine), (SM), silty, with abundant cinders, abundant subangular to subrounded gravel.
						1.0	
2-12'	AU				NA	2.0	SAND (black to dark grey, medium to fine), (SM), silty, with some subangular to subrounded gravel.
						3.0	
						4.0	
						5.0	
						6.0	
						7.0	
						8.0	
						9.0	
						10.0	
						11.0	
12-14'	SS	1.5	W		NA	12.0	SAND (dark grey, medium to fine), (SM), silty, no gravel, trace clay @ 14' bls.
						13.0	
14-15'	SS	75	W		NA	14.0	CLAY (dark grey to black), (CL), soft, low plasticity.
15-15.5'	SS	5	W		NA	15.0	SAND (dark grey), lense to 15.2' bls.
15.5-16.5'	SS	1.5	W		NA		CLAY (dark grey), (CL), soft low plasticity.
						16.0	GRAVEL (subangular to subrounded) to 17.6' bls.
16.5-18'	SS	1.0	S		NA		
						17.0	SAND (dark grey), (SM), medium dense, with some gravel.
18-20'	SS	5	S		NA	18.0	GRAVEL with some sand.
						19.0	
20-22'	SS	5	S		NA	20.0	GRAVEL with some sand to 21.7' bls.
						21.0	CLAY (dark grey), silty seam.
22-24'	SS		S		NA	22.0	No recovery, second attempt-4" gravel.

LITHOLOGY / WELL INSTALLATION



FIELD BOREHOLE LOG

BOREHOLE NUMBER: GM-J2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, IL
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW-STEM AUGERS
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/25/96 DATE COMPLETED: 10/2/96

GROUND SURFACE ELEVATION (Ft): 563.3
MEASURING POINT ELEVATION (Ft): 565.31
TOTAL DEPTH (Ft): 25.2
DEPTH TO WATER (Ft): 24.8 (10/2/96)
SHEET: 2 OF: 2

DEPTH INTERVAL	SAMPLE TYPE	RECOVERY	MOISTURE	N-VALUE	PID	DEPTH	VISUAL CLASSIFICATION	LITHOLOGY	WELL INSTALLATION
						23.0			
						24.0			
						25.0	Filename = GM-J2A DEM & GM-J2B DEM		
						26.0			
						27.0			
						28.0			
						29.0			
						30.0			
						31.0			
						32.0			
						33.0			
						34.0			
						35.0			
						36.0			
						37.0			
						38.0			
						39.0			
						40.0			
						41.0			
						42.0			
						43.0			
						44.0			
						45.0			
						46.0			
						47.0			

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Environment and Infrastructure
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-A1

PROJECT NUMBER: CI0299 014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/20/96 DATE COMPLETED: 9/20/96

GROUND SURFACE ELEVATION (ft): 567.4
MEASURING POINT ELEVATION (ft): 569.37
BOREHOLE DIAMETER (in): 8.0
STATIC DEPTH TO WATER (ft): 14.2
TOTAL DEPTH (ft): 18

DESCRIPTION

PROTECTIVE CASING TYPE: PVC
DIAMETER: 6 INCH
LENGTH: 5 FEET

SURFACE SEAL MATERIAL: CONCRETE

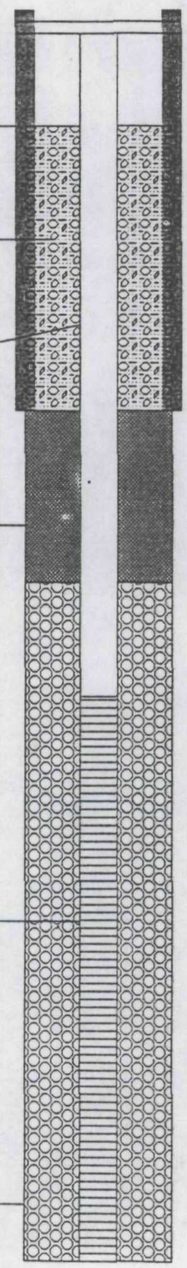
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 10 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
+1.97	569.37
3	564.4
6	561.4
8	559.4
18	549.4

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WELL CONSTRUCTION LOG

WELL NUMBER:

GM-A2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/20/96 DATE COMPLETED 9/20/96

GROUND SURFACE ELEVATION (ft): 564.6
MEASURING POINT ELEVATION (ft): 566.40
BOREHOLE DIAMETER (in): 8.0
STATIC DEPTH TO WATER (ft): 11.1
TOTAL DEPTH (ft): 16.5

DESCRIPTION

PROTECTIVE CASING TYPE: PVC
DIAMETER: 6 INCH
LENGTH: 5 FEET

SURFACE SEAL MATERIAL: CONCRETE

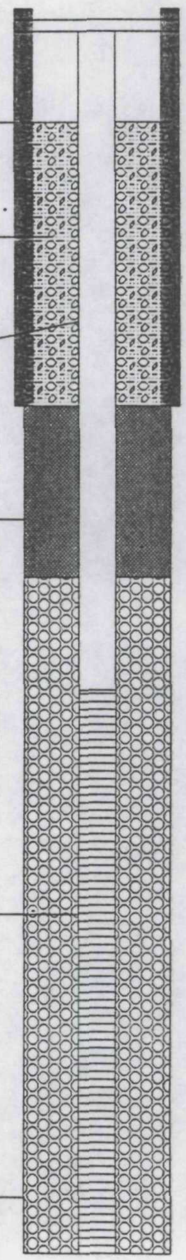
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 8.3 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH.	ELEVATION
+1.8	566.40
3	562.1
5.5	559.1
6.5	558.1
16.5	548.1

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WELL CONSTRUCTION LOG

WELL NUMBER:

GM-A3

PROJECT NUMBER: CI0299 014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/20/96 DATE COMPLETED: 9/20/96

GROUND SURFACE ELEVATION (ft): 561 9
MEASURING POINT ELEVATION (ft): 563 71
BOREHOLE DIAMETER (in): 8.0
STATIC DEPTH TO WATER (ft): 9.5
TOTAL DEPTH (ft): 14.0

DESCRIPTION

PROTECTIVE CASING TYPE: PVC
DIAMETER: 6 INCH
LENGTH: 5 FEET

SURFACE SEAL MATERIAL: CONCRETE

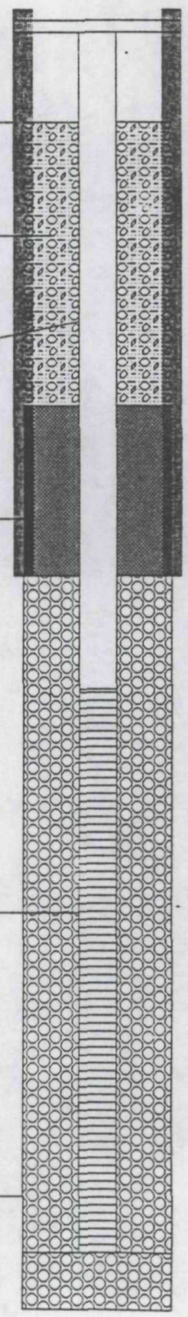
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 5.31 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
+1 81	563 71
1 5	560 4
3 0	558 9
3 5	558 4
13 5	548 1
14 0	547 6

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WELL CONSTRUCTION LOG

WELL NUMBER: GM-B1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/24/96 DATE COMPLETED: 9/24/96

GROUND SURFACE ELEVATION (ft): 567.0
MEASURING POINT ELEVATION (ft): 568.92
BOREHOLE DIAMETER (in): 8.0
STATIC DEPTH TO WATER (ft): 14
TOTAL DEPTH (ft): 19.0

DESCRIPTION

PROTECTIVE CASING TYPE: PVC
DIAMETER: 6 INCH
LENGTH: 5 FEET

SURFACE SEAL MATERIAL: CONCRETE

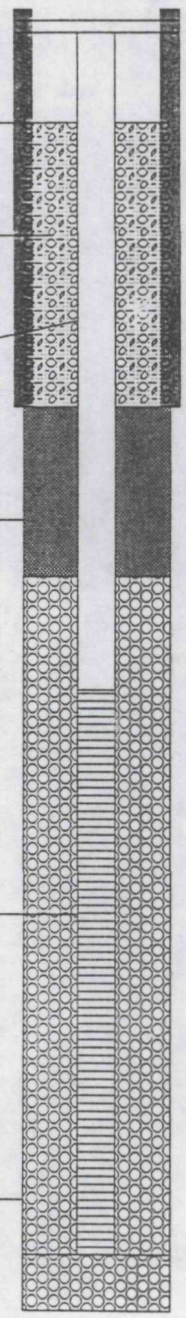
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 10.4 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
+1.92	568.92
3.0	564.0
6.5	560.5
8.5	558.5
18.5	548.5
19.0	548.0

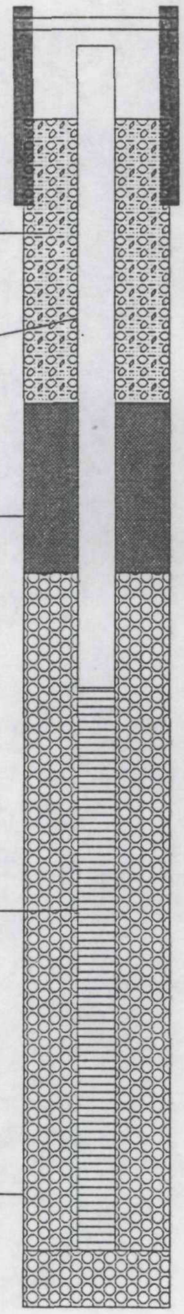
GERAGHTY & MILLER, INC.
Environment and Infrastructure
a heidemij company

WELL CONSTRUCTION LOG

WELL NUMBER: GM-B2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/23/96   DATE COMPLETED: 9/23/96

GROUND SURFACE ELEVATION (ft): 567.4
MEASURING POINT ELEVATION (ft): 566.90
BOREHOLE DIAMETER (in): 8.0
STATIC DEPTH TO WATER (ft): 14.5
TOTAL DEPTH (ft): 19.0

DESCRIPTION	DIAGRAM (NOT TO SCALE)	DEPTH	ELEVATION
		-0.5	566.90
SURFACE SEAL MATERIAL: CONCRETE			
SOLID PIPE/RISER TYPE: PVC RISER LENGTH: 7.5 FEET RISER DIAMETER: 2 INCH		3.0	564.4
SEAL MATERIAL: BENTONITE		6.0	561.4
		8.0	559.4
SCREEN MATERIAL: PVC SCREEN LENGTH: 10 FEET SCREEN DIAMETER: 2 INCH OPENING SIZE: 0.020 SLOT PVC			
FILTER PACK MATERIAL: SAND NO. 3		18.0	549.4
		19.0	548.4

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-C1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/23/96 DATE COMPLETED 9/23/96

GROUND SURFACE ELEVATION (ft): 568.05
MEASURING POINT ELEVATION (ft): 567.54
BOREHOLE DIAMETER (in): 8.0
STATIC DEPTH TO WATER (ft): 15
TOTAL DEPTH (ft): 21.0

DESCRIPTION

SURFACE SEAL MATERIAL: CONCRETE

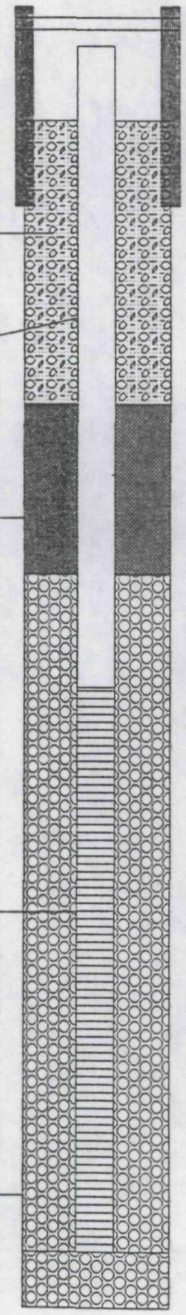
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 9.99 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
-0.51	567.54
3.0	565.05
9.0	559.05
10.5	557.55
20.5	547.55
21.0	547.05

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-C2

PROJECT NUMBER: CI0299 014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 10/1/96 DATE COMPLETED: 10/1/96

GROUND SURFACE ELEVATION (ft): 568 08
MEASURING POINT ELEVATION (ft): 567 71
BOREHOLE DIAMETER (in): 8 0
STATIC DEPTH TO WATER (ft): 17
TOTAL DEPTH (ft): 18 0

DESCRIPTION

SURFACE SEAL MATERIAL: CONCRETE

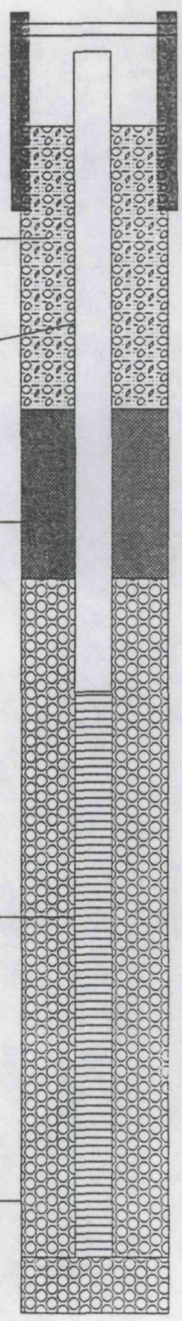
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 7.13 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
-0 37	567 71
3 0	565 08
5 5	562 58
7 5	560 58
17 5	550 58
18 0	550 08

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-C3

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/20/96 DATE COMPLETED: 9/20/96

GROUND SURFACE ELEVATION (ft): 564.7
MEASURING POINT ELEVATION (ft): 566.44
BOREHOLE DIAMETER (in): 8.0
STATIC DEPTH TO WATER (ft): 14
TOTAL DEPTH (ft): 17.0

DESCRIPTION

PROTECTIVE CASING TYPE: PVC
DIAMETER: 6 INCH
LENGTH: 5 FEET

SURFACE SEAL MATERIAL: CONCRETE

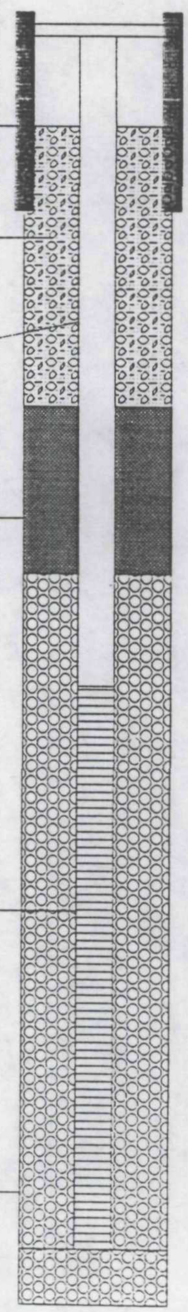
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 8.24 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM
(NOT TO SCALE)



DEPTH	ELEVATION
+1.74	566.44
3.0	561.7
5.0	559.7
6.5	558.2
17.5	547.2
18.0	546.7

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-D1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/24/96 DATE COMPLETED: 9/24/96

GROUND SURFACE ELEVATION (ft): 568.35
MEASURING POINT ELEVATION (ft): 570.15
BOREHOLE DIAMETER (in): 8.0
STATIC DEPTH TO WATER (ft): 14
TOTAL DEPTH (ft): 17.0

DESCRIPTION

PROTECTIVE CASING TYPE: PVC
DIAMETER: 6 INCH
LENGTH: 5 FEET

SURFACE SEAL MATERIAL: CONCRETE

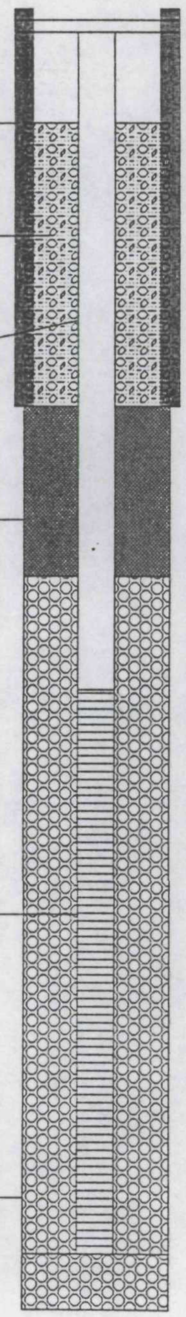
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 9.3 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
+1.8	570.15
3.0	565.35
5.5	562.85
7.5	560.85
17.5	550.85
18.0	550.35

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

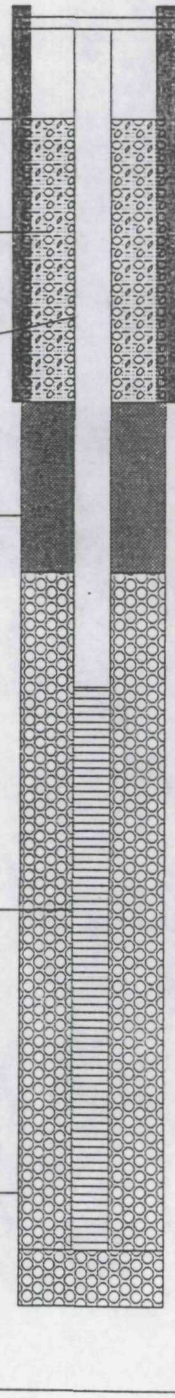
WELL NUMBER:

GM-E1

PROJECT NUMBER CI0299 014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/24/96 DATE COMPLETED: 9/24/96

GROUND SURFACE ELEVATION (ft): 568 0
MEASURING POINT ELEVATION (ft): 569 97
BOREHOLE DIAMETER (in): 8 0
STATIC DEPTH TO WATER (ft): 16
TOTAL DEPTH (ft): 19.0

DESCRIPTION	DIAGRAM (NOT TO SCALE)	DEPTH	ELEVATION
		+1 97	569 97
PROTECTIVE CASING TYPE: PVC DIAMETER: 6 INCH LENGTH: 5 FEET			
SURFACE SEAL MATERIAL: CONCRETE			
SOLID PIPE/RISER TYPE: PVC RISER LENGTH: 10.47 FEET RISER DIAMETER: 2 INCH			
		3 0	565 0
SEAL MATERIAL: BENTONITE			
		6 5	561 5
		8 5	559 5
SCREEN MATERIAL: PVC SCREEN LENGTH: 10 FEET SCREEN DIAMETER: 2 INCH OPENING SIZE: 0.020 SLOT PVC			
FILTER PACK MATERIAL: SAND NO. 3			
		18 5	549 5
		19 0	549



GERAGHTY & MILLER, INC.
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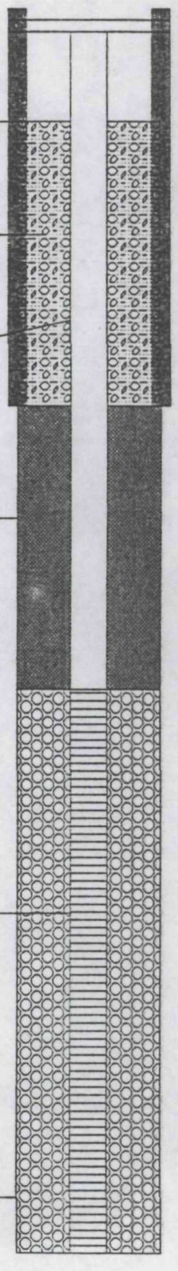
WELL CONSTRUCTION LOG

WELL NUMBER: GM-F1

PROJECT NUMBER: CI0299 014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/27/96 DATE COMPLETED: 10/4/96

GROUND SURFACE ELEVATION (ft): 566.7
MEASURING POINT ELEVATION (ft): 568.64
BOREHOLE DIAMETER (in): 10.0
STATIC DEPTH TO WATER (ft): 20.1
TOTAL DEPTH (ft): 31.8

DESCRIPTION	DIAGRAM (NOT TO SCALE)	DEPTH	ELEVATION
		+1.94	568.64
PROTECTIVE CASING TYPE: STEEL/PVC DIAMETER: 8 INCH/6 INCH LENGTH: 19 FEET/3 FEET			
SURFACE SEAL MATERIAL: CONCRETE			
SOLID PIPE/RISER TYPE: PVC RISER LENGTH: 23.3 FEET RISER DIAMETER: 2 INCH		3.0	563.7
SEAL MATERIAL: BENTONITE		21.4	545.3
SCREEN MATERIAL: PVC SCREEN LENGTH: 10.4 FEET SCREEN DIAMETER: 2 INCH OPENING SIZE: 0.020 SLOT PVC			
FILTER PACK MATERIAL: SAND NO. 3		31.8	534.9

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-F2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 10/1/96 DATE COMPLETED: 10/8/95

GROUND SURFACE ELEVATION (ft): 567.5
MEASURING POINT ELEVATION (ft): 569.43
BOREHOLE DIAMETER (in): 10.0
STATIC DEPTH TO WATER (ft): 21.6
TOTAL DEPTH (ft): 30.7

DESCRIPTION

PROTECTIVE CASING TYPE: STEEL/PVC
DIAMETER: 8 INCH/6 INCH
LENGTH: 19 FEET/3 FEET

SURFACE SEAL MATERIAL: CONCRETE

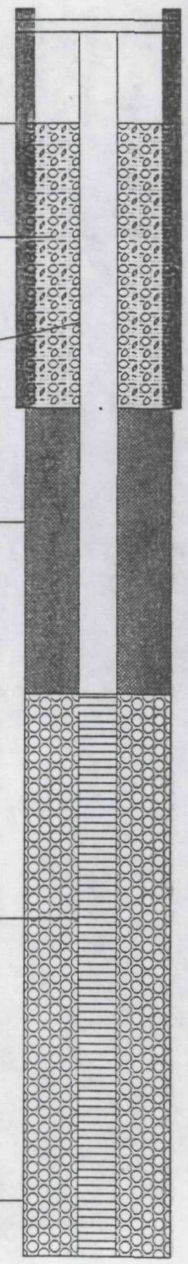
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 22.83 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 9.8 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
+1.93	569.43
3.0	564.5
20.9	546.6
30.7	536.8

GERAGHTY & MILLER, INC.
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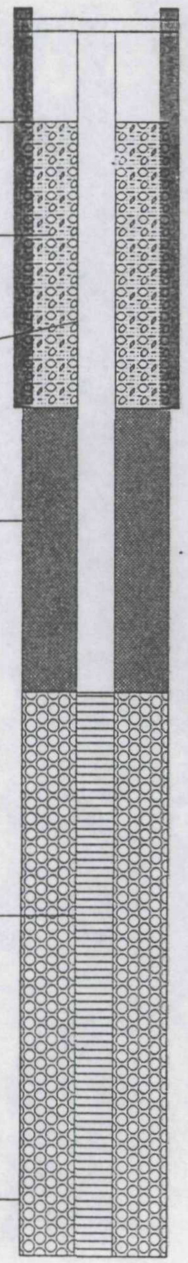
WELL CONSTRUCTION LOG

WELL NUMBER: GM-F3

PROJECT NUMBER CI0299 014
PROJECT NAME SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/27/96 DATE COMPLETED 10/4/96

GROUND SURFACE ELEVATION (ft): 567 3
MEASURING POINT ELEVATION (ft): 569 27
BOREHOLE DIAMETER (in): 10 0
STATIC DEPTH TO WATER (ft): 22 4
TOTAL DEPTH (ft): 29 6

DESCRIPTION	DIAGRAM (NOT TO SCALE)	DEPTH	ELEVATION
PROTECTIVE CASING TYPE: STEEL/PVC DIAMETER: 8 INCH/6 INCH LENGTH: 19 FEET/3 FEET		+1 97	569 27
SURFACE SEAL MATERIAL: CONCRETE			
SOLID PIPE/RISER TYPE: PVC RISER LENGTH 21.17 FEET RISER DIAMETER: 2 INCH		3 0	564 3
SEAL MATERIAL: BENTONITE		19 2	548 1
SCREEN MATERIAL: PVC SCREEN LENGTH: 10.4 FEET SCREEN DIAMETER: 2 INCH OPENING SIZE: 0.020 SLOT PVC			
FILTER PACK MATERIAL: SAND NO. 3		29 6	537 7

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-G1

PROJECT NUMBER CI0299 014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/30/96 DATE COMPLETED 10/7/96

GROUND SURFACE ELEVATION (ft) 568.19
MEASURING POINT ELEVATION (ft) 570.10
BOREHOLE DIAMETER (in): 8.0
STATIC DEPTH TO WATER (ft): 22.5
TOTAL DEPTH (ft): 33.7

DESCRIPTION

PROTECTIVE CASING TYPE: STEEL/PVC
DIAMETER: 8 INCH/6 INCH
LENGTH: 19.5 FEET/5 FEET

SURFACE SEAL MATERIAL: CONCRETE

SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 25.31 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10.3 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)

DEPTH	ELEVATION
+1 91	570 10
3 0	565 19
23 4	544 79
33 7	534 49

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-G2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/26/96 DATE COMPLETED: 10/3/96

GROUND SURFACE ELEVATION (ft): 568.3
MEASURING POINT ELEVATION (ft): 570.20
BOREHOLE DIAMETER (in): 10 INCH
STATIC DEPTH TO WATER (ft): 22.2
TOTAL DEPTH (ft): 29.7

DESCRIPTION

PROTECTIVE CASING TYPE: STEEL/PVC
DIAMETER: 8 INCH/6 INCH
LENGTH: 19.5 FEET/5 FEET

SURFACE SEAL MATERIAL: CONCRETE

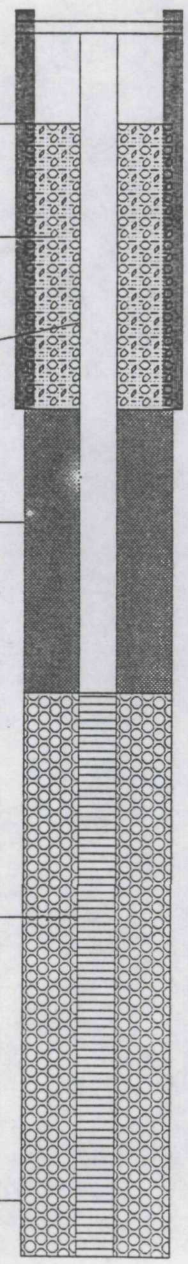
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 21.4 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10.2 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
+1.9	570.20
3.0	565.3
19.5	548.8
29.7	538.6

GERAGHTY & MILLER, INC.
Environment and Infrastructure
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WELL CONSTRUCTION LOG

WELL NUMBER:

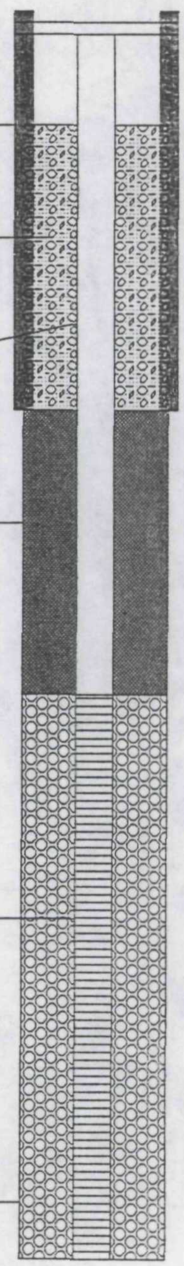
GM-G3

PROJECT NUMBER CI0299 014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/26/96 DATE COMPLETED: 10/3/96

GROUND SURFACE ELEVATION (ft): 568 3
MEASURING POINT ELEVATION (ft): 570 21
BOREHOLE DIAMETER (in): 10.0
STATIC DEPTH TO WATER (ft): 22 2
TOTAL DEPTH (ft): 30

DESCRIPTION

DIAGRAM (NOT TO SCALE)



PROTECTIVE CASING TYPE: STEEL/PVC
DIAMETER: 8 INCH/6 INCH
LENGTH: 19.0 FEET/3 FEET

SURFACE SEAL MATERIAL: CONCRETE

SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 21.61 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10.0 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DEPTH	ELEVATION
+1 91	570 21
3 0	565 3
19 7	548 6
30	538 3

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

WELL NUMBER:

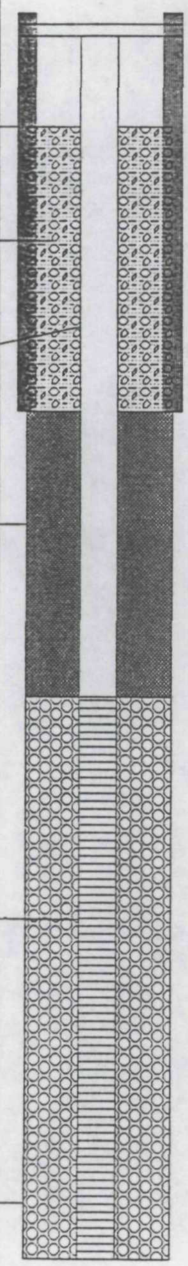
GM-I1

PROJECT NUMBER CI0299 014
PROJECT NAME SYLVAN SLOUGH
LOCATION ROCK ISLAND, ILLINOIS
DRILLING COMPANY GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/30/96 DATE COMPLETED 10/7/96

GROUND SURFACE ELEVATION (ft) 567 83
MEASURING POINT ELEVATION (ft) 569 79
BOREHOLE DIAMETER (in) 10
STATIC DEPTH TO WATER (ft) 22
TOTAL DEPTH (ft): 31.3

DESCRIPTION	DEPTH	ELEVATION
	+1 96	569 79
PROTECTIVE CASING TYPE: STEEL/PVC DIAMETER: 8 INCH/6 INCH LENGTH: 19.5 FEET/5 FEET		
SURFACE SEAL MATERIAL: CONCRETE		
SOLID PIPE/RISER TYPE: PVC RISER LENGTH: 22.96 FEET RISER DIAMETER: 2 INCH		
	3 0	564 83
SEAL MATERIAL: BENTONITE		
	21	546 83
SCREEN MATERIAL: PVC SCREEN LENGTH: 10.3 FEET SCREEN DIAMETER: 2 INCH OPENING SIZE: 0.020 SLOT PVC		
FILTER PACK MATERIAL: SAND NO. 3		
	31 3	536 53

DIAGRAM
(NOT TO SCALE)



GERAGHTY & MILLER, INC.
Environment and Infrastructure
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-I2

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 10/1/96 DATE COMPLETED: 10/8/96

GROUND SURFACE ELEVATION (ft): 567.86
MEASURING POINT ELEVATION (ft): 569.67
BOREHOLE DIAMETER (in): 10
STATIC DEPTH TO WATER (ft): 22
TOTAL DEPTH (ft): 31

DESCRIPTION

PROTECTIVE CASING TYPE: STEEL/PVC
DIAMETER: 8 INCH/6 INCH
LENGTH: 5 FEET

SURFACE SEAL MATERIAL: CONCRETE

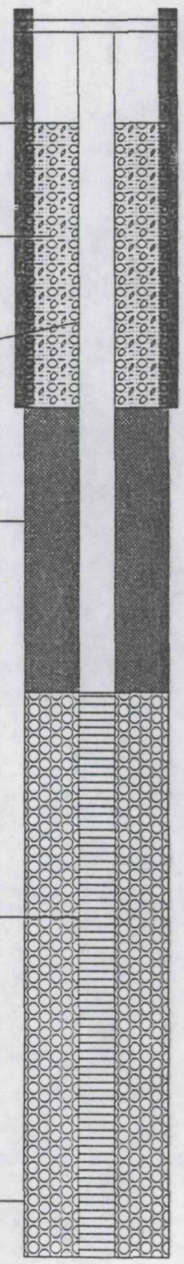
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 22.51 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10.3 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
+1.81	569.67
3.0	564.86
20.7	547.16
31	536.86

GERAGHTY & MILLER, INC.
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WELL CONSTRUCTION LOG

WELL NUMBER: GM-J1

PROJECT NUMBER: CI0299.014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/25/96 DATE COMPLETED: 10/3/96

GROUND SURFACE ELEVATION (ft): 564.6
MEASURING POINT ELEVATION (ft): 566.55
BOREHOLE DIAMETER (in): 10
STATIC DEPTH TO WATER (ft): 18
TOTAL DEPTH (ft): 27.7

DIAGRAM (NOT TO SCALE)

DESCRIPTION	DEPTH	ELEVATION
	+1.95	566.55
PROTECTIVE CASING TYPE: STEEL/PVC DIAMETER: 8 INCH/6 INCH LENGTH: 16.5 FEET/5 FEET		
SURFACE SEAL MATERIAL: CONCRETE		
SOLID PIPE/RISER TYPE: PVC RISER LENGTH: 19.35 FEET RISER DIAMETER: 2 INCH	3.0	561.6
SEAL MATERIAL: BENTONITE	17.4	547.2
SCREEN MATERIAL: PVC SCREEN LENGTH: 10.3 FEET SCREEN DIAMETER: 2 INCH OPENING SIZE: 0.020 SLOT PVC		
FILTER PACK MATERIAL: SAND NO. 3	27.7	536.9

GERAGHTY & MILLER, INC.
Environment and Infrastructure
a heidemij company

WELL CONSTRUCTION LOG

WELL NUMBER: GM-J2

PROJECT NUMBER: CI0299 014
PROJECT NAME: SYLVAN SLOUGH
LOCATION: ROCK ISLAND, ILLINOIS
DRILLING COMPANY: GSI
DRILLING METHOD: HOLLOW STEM AUGER
DRILLER: MATT
GEOLOGIST: JIM HERTEL
DATE BEGUN: 9/25/96 DATE COMPLETED 10/2/96

GROUND SURFACE ELEVATION (ft): 563.3
MEASURING POINT ELEVATION (ft): 565.31
BOREHOLE DIAMETER (in): 10
STATIC DEPTH TO WATER (ft): 24.8
TOTAL DEPTH (ft): 25.2

DESCRIPTION

PROTECTIVE CASING TYPE: STEEL/PVC
DIAMETER: 8 INCH/6 INCH
LENGTH: 14.5 FEET/5 FEET

SURFACE SEAL MATERIAL: CONCRETE

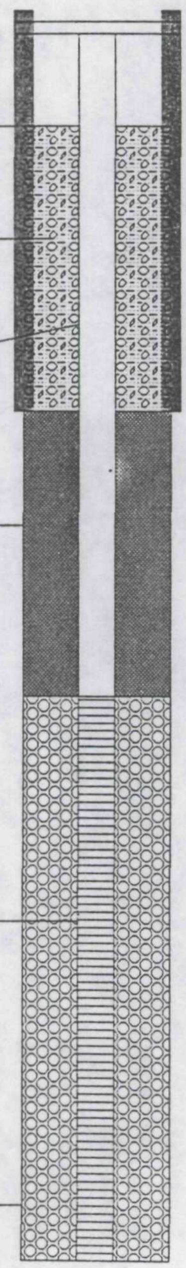
SOLID PIPE/RISER TYPE: PVC
RISER LENGTH: 17.0 FEET
RISER DIAMETER: 2 INCH

SEAL MATERIAL: BENTONITE

SCREEN MATERIAL: PVC
SCREEN LENGTH: 10.2 FEET
SCREEN DIAMETER: 2 INCH
OPENING SIZE: 0.020 SLOT PVC

FILTER PACK MATERIAL: SAND NO. 3

DIAGRAM (NOT TO SCALE)



DEPTH	ELEVATION
+2.01	565.31
3.0	560.30
15	548.30
25.20	538.10